OCTOBER, 1928

AMERICAN GAS JOURNAL

Established 1859 *Pioneer of the Gas Industry*

Vol. 129, No. 4 Including · GAS INDUSTRY · Est. 1900 · Price 25 Cents

IF IT'S DONE WITH HEAT YOU CAN DO IT BETTER WITH GAS

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STRIKING EVIDENCE OF LEADERSHIP IN MEASUREMENT ENGINEERING IS PRESENTED ON PAGES
79~80~81~82

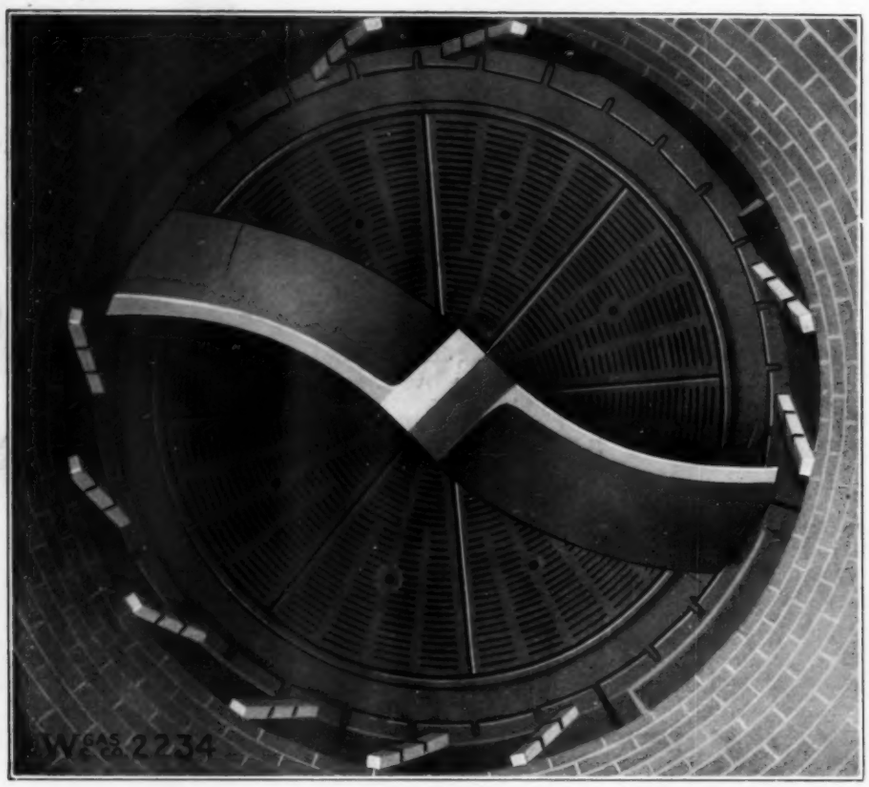
A Clean, Active, Uniform Fire Bed in Your Generators

This much-sought-for condition in your generators can be easily obtained with a consequent elimination of clinkering labor, reduced oil consumption, saving of fuel, low maintenance costs and the production of a higher grade of blue gas, if your machines are equipped with the

A-B-C SELF-CLINKERING GENERATOR BASE

The statement above is not based on theory, but from the result of over two years' continuous service under actual plant operation.

It's All in the Agitating Beam!



It will pay you to write for further details

This hollow, water-cooled cast steel beam revolving in a horizontal plane over the grate, continuously and positively removes the ash and imparts in the lower portion of the active fuel bed a motion that insures each horizontal cross-section will be uniform in density and temperature.

Furthermore, this beam precludes the formation of large clinkers in the fuel bed and the clinkering of side walls and keeps the center of the fuel bed in a loosened, active condition.

A study of the accompanying plan view of Beam will give a faint idea of how the beam accomplishes this, but a complete descriptive catalog, which can be had for the asking, will describe its operation in detail and show many other unique advantages of the A-B-C Self-Clinkering Generator Base, that will result in big economies and increase the profit on the send-out.

THE WESTERN GAS CONSTRUCTION CO.

FORT WAYNE, INDIANA

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900

Published Monthly by American Gas Journal, Inc., at 34 North Crystal St., East Stroudsburg, Pa. Executive and Editorial Offices at 53 Park Place, New York, N. Y.

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R. S. MCBRIDE, *Consulting Editor*—Washington, D. C.
Pacific Coast Representative—NORMAN C. NOURSE, 681 Market St., San Francisco, Cal.

Vol. 129, No. 4 **October, 1928** Whole Number 3658

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SULZER
DRY QUENCHER
Type C

THE Sulzer Dry Quencher, Type C, now available to the smaller gas and coke works, assures all the advantages of Dry Quenching formerly possible only in large installations. A new pamphlet on the Type C Dry Quencher is now available.

There Are Two Methods of Cooling Coke

	WET QUENCHING	DRY QUENCHING
1	The heat contained in the hot coke is entirely wasted.	The heat of the hot coke is reclaimed and utilized for steam generation.
2	Wet Quenched Coke contains a high and variable percentage of moisture, entailing increased fuel consumption when the coke is burned.	The percentage of moisture in Dry Quenched Coke is low, uniform and controllable, thus reducing fuel consumption. If desired, an absolutely dry coke can be produced.
3	In regions where the water supply is limited, wet quenching is wasteful and costly.	There is no water to furnish, pump and dispose of, in Dry Quenching.
4	The vapors from the steam arising in the wet quenching process lead to high maintenance of plant steel work.	Dry Quenching of Coke eliminates this plant steel work maintenance.
5	In cold weather, difficulties are encountered due to freezing.	No water used in Dry Quenching—hence there is no freezing.

THE Sulzer System for Dry Quenching coke is simple and dependable. In the Type C Dry Quencher the hot coke is put in a special coke car and this car is placed in a sealed quenching chamber. Inert gases are circulated in a closed cycle, by means of a fan, through the hot coke mass where they absorb the sensible heat of the hot coke and this heat is transferred to the water in the boiler circulation and converted into steam.

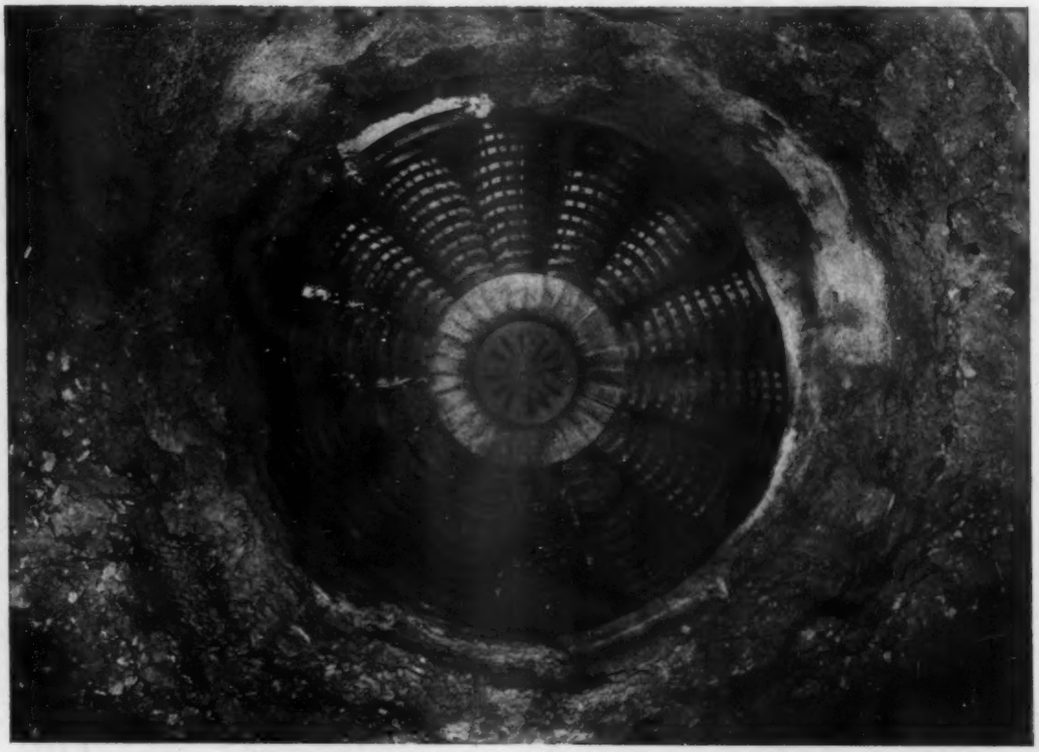
Dry Quenching Equipment Corporation

INTERNATIONAL COMBUSTION BUILDING

200 MADISON AVE. NEW YORK — N.Y.

A SUBSIDIARY OF INTERNATIONAL COMBUSTION ENGINEERING CORPORATION

The Clinkering Problem Solved



Here is an example of the effectiveness of the Steere Clinkering System.

Before this system was installed, the generator illustrated had to be taken out of service every day for barring down and cleaning out.

The picture shows this same generator as it looked after eight days of operation, without hand clinkering or barring down.

We believe that we can duplicate such performance on your plant. We will put our clinkering system on your water gas generator with the unreserved condition that—

It has to prove its worth to become a sale.

SEMET-SOLVAY
ENGINEERING CORPORATION
Division Allied Chemical and Dye Corp.
40 RECTOR ST. NEW YORK

Complete Gas Plants

GAS OVENS

View to right shows Top of Oven Battery

This view shows the Pusher Side of Ovens

You will find a Hearty Welcome in Booth 53

The Gas Machinery Com

Special Machinery

End details, showing Simplicity and Strength

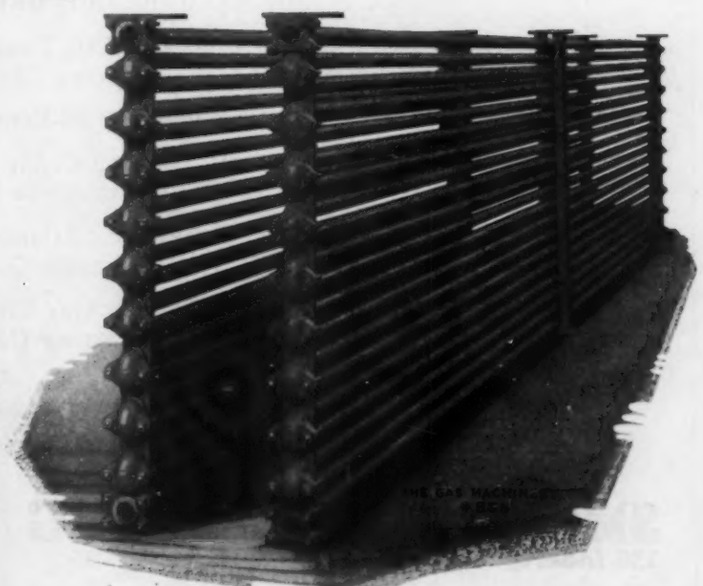
COOLING COILS

With 2-inch Tubes

Patent Pending

We also Design and Manufacture:

BENCHES,
BY-PRODUCT GAS OVENS,
PURIFIERS,
AMMONIA CONCENTRATORS,
TAR EXTRACTORS,
VALVES AND CONNECTIONS,
WASHERS



Assembled Coils—Full area of pipe in bends.
Built 20 to 40 Tubes high.

pany Cleveland, Ohio.

28-3
Atlantic City Gas Co., Atlantic City, N. J., operated by The C. H. Geist Co. Installation 9 ft. x 30 ft. Smoot Steam Accumulator. The U. G. I. Contracting Co., Engineers.

28-4
Hudson Valley Coke & Products Co., Troy, N. Y., installation of 9 ft. x 30 ft. Smoot Steam Accumulator. Semet-Solvay Engineering Corp., Engineers.

SMOOT STEAM ACCUMULATOR

Recent Installations of the
Smoot Steam Accumulator and Control System

Pittsfield Coal Gas Co., Pittsfield, Mass.
Semet-Solvay Engineering Corp., Engineers

Consumers Power Co., Pontiac, Mich.

Cedar Rapids Gas Co., Cedar Rapids, Iowa
The Western Gas Construction Co., Engineers

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SMOOT ENGINEERING CORPORATION
136 Liberty Street **New York**

SMOOT CONTROL

U. G. I.

STANDS FOR AND SQUARELY BEHIND CERTAIN THINGS

viz:-

UNITED in its cooperative effort to give its clients and customers the best engineering, technical advice and materials possible, in order to produce the greatest value per customer-dollar expended.

GAS The mainstay of American household comfort. Our technical and business staffs are without superiors in their knowledge of and application to this fundamental industry. They are at your service.

IMPROVEMENT This has been the watchword and the aim of our organization since its inception. The results are so well known and far reaching that they are common knowledge. The improvements worked out by our staff mean betterments for you.

THE U. G. I. CONTRACTING COMPANY

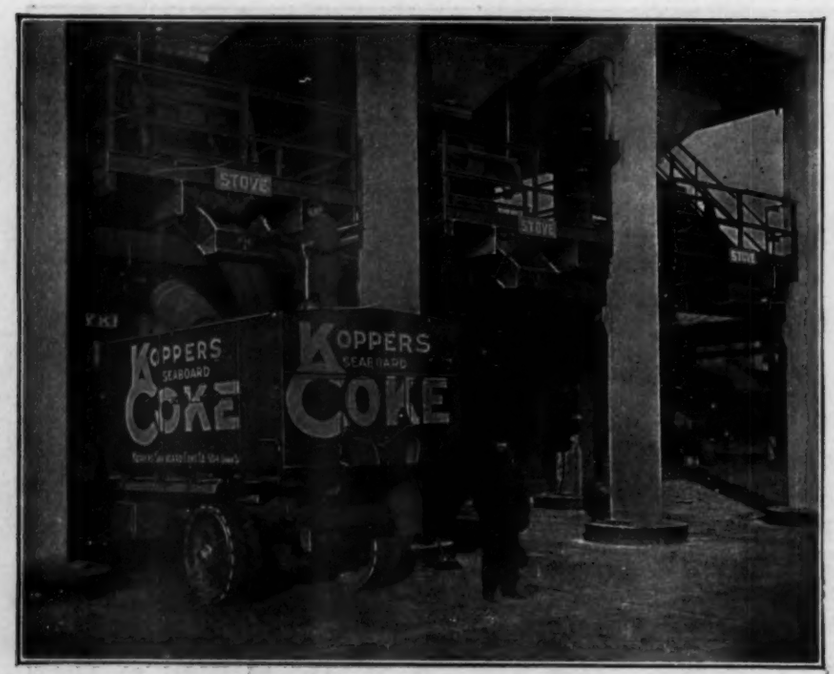
DIVISION OF

UNITED ENGINEERS & CONSTRUCTORS, INC.
Dwight P. Robinson, Pres.

Principal Office—PHILADELPHIA

CHICAGO ATLANTA

UNITED FOR GAS INDUSTRY IMPROVEMENT



This view shows three, of a battery of thirteen Mitchell Electric Vibrating Screens, recently installed in the Union Street Plant of the Koppers Seaboard Coke Co., Brooklyn, N. Y.

The MITCHELL ELECTRIC VIBRATING SCREEN

For perfect screening of coal and coke the Mitchell Screen has proved itself unsurpassed. The appended list of a few of the best known users, undoubtedly testify their satisfaction in the efficient performance of the Mitchell by the number of reorders.

Rochester Gas & Electric Corp., Rochester, N. Y.	24
Koppers Seaboard Coke Co., Union St., Brooklyn, N. Y.	13
Consolidated Gas Company, West Farms, N. Y.	13
Syracuse Lighting Company, Syracuse, N. Y.	10
Utica Gas & Electric Co., Utica, N. Y.	4
Northern Indiana Gas Co., Ft. Wayne, Ind.	4
Recent orders include —	
Philadelphia Coke Company of Philadelphia, Pa.	10
Connecticut Coke Company of New Haven, Conn.	10

Your visit to the Convention Exhibits will be incomplete unless you examine *critically*, the full size Mitchell, especially the rotor, which is literally open for your inspection in

BOOTH 252

WE DESIGN AND BUILD:

Industrial Railways, Automatic Railways, Cable Railways, Cars, Tracks, Switches, Motor Cars, Scales, Conveyors, Skip Hoists, Electric Vibrating Screens, Cut-off Valves, or Gates, Weighing and Measuring Devices, Coal Crackers, "Stevedore" Transmission Rope and Hoisting Rope, and the "Flotograv" (Coke Reclamation System).

Showing one of a battery of 24 Mitchell Electric Vibrating Screens suspended from structural iron work, under coke storage bins, delivering direct to truck.

C. W. HUNT COMPANY, Inc.

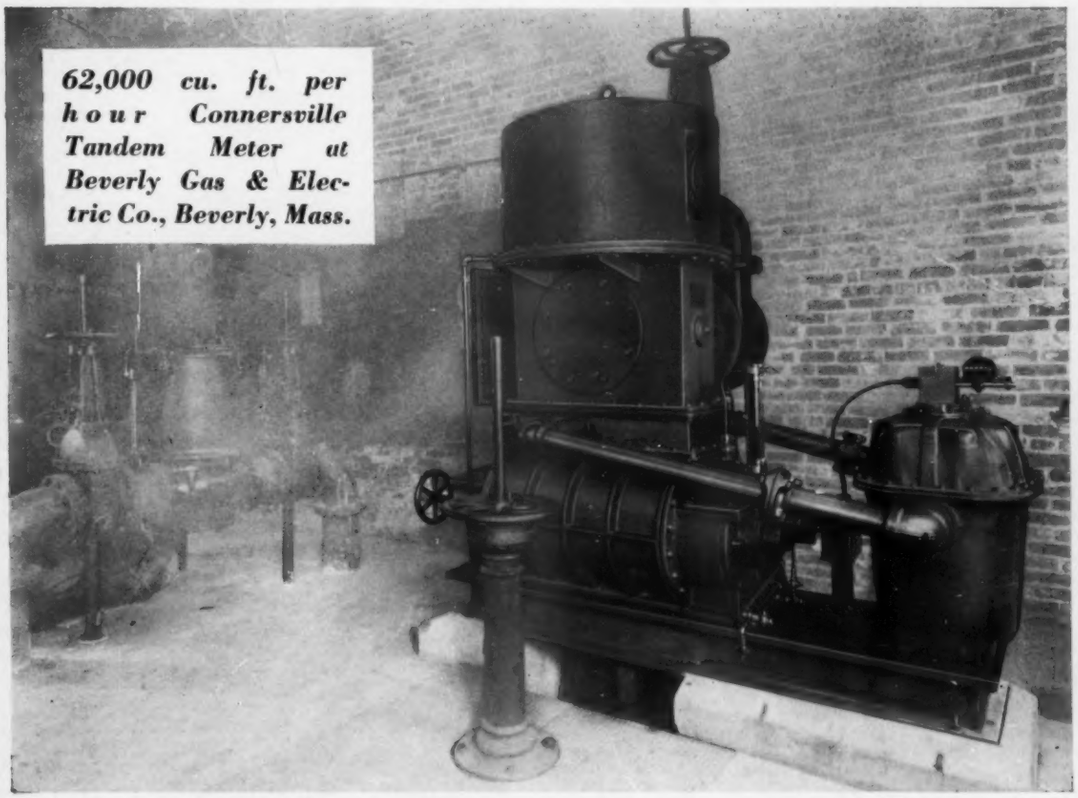
West New Brighton, Staten Island, New York

PHILLIPS LANG & CO., Inc.
431 S. Dearborn St., Chicago, Ill.

ENGINEERING EQUIPMENT CO., Ltd.
358 Beaver Hall Square, Montreal

ERNEST F. LEARNED
141 Milk St., Boston 9, Mass.

THE CONNERSVILLE TANDEM METER



62,000 cu. ft. per hour Connersville Tandem Meter at Beverly Gas & Electric Co., Beverly, Mass.

Where normal volume is large but the "off-load" diminishes to zero.

Where pilot light loads, and the very low rates of flow must be accounted for, on installations that have high normal volumes, the Connersville Tandem Meter gives you that dependably accurate measurement through the extreme variations.

A self-contained unit on one base, it is easy to install. Even for the larger capacities, it is economical to set up, for there is only one inlet and one outlet connection to make. The operation of the meter is automatic. Even the meter reader has an easy time reading the single, direct-recording register that is used.

Information about this Connersville Tandem Meter may be obtained from any of our offices.

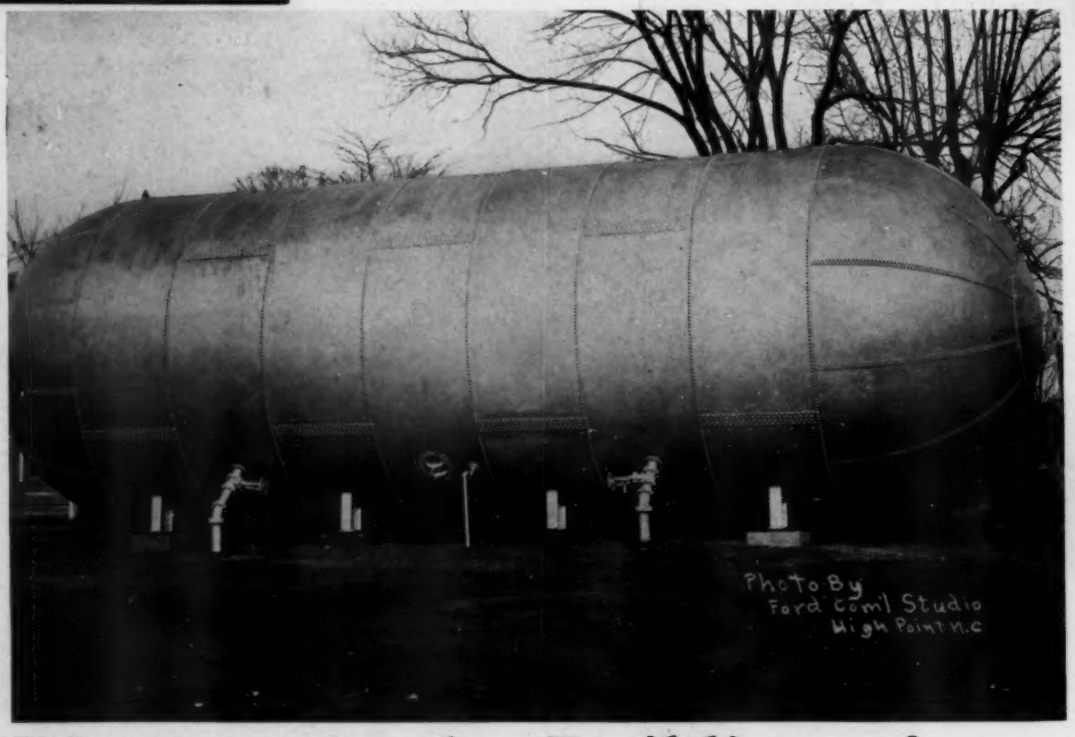
THE CONNERSVILLE BLOWER COMPANY

12th Street and Columbia Ave. **Connersville, Indiana**

Chicago	Pittsburgh	Boston	New York
1454 Monadnock Block	604 Chamber of Commerce Building	250 Stuart Street	114 Liberty Street

THE BUILDERS
FOR SEVENTY

An enviable record of over three-quarters of a century, is our contribution to the Gas Industry. In all that time the unqualifiedly high character of our products has been maintained, which has been proved by the number of reorders we are receiving.

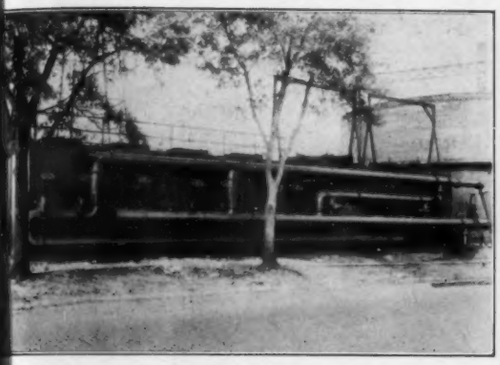


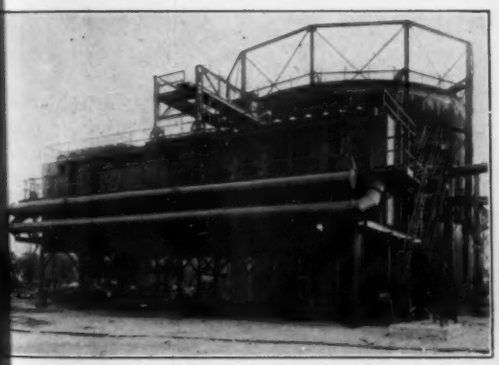
Pioneers in the Building of HIGH PRESSURE TANKS

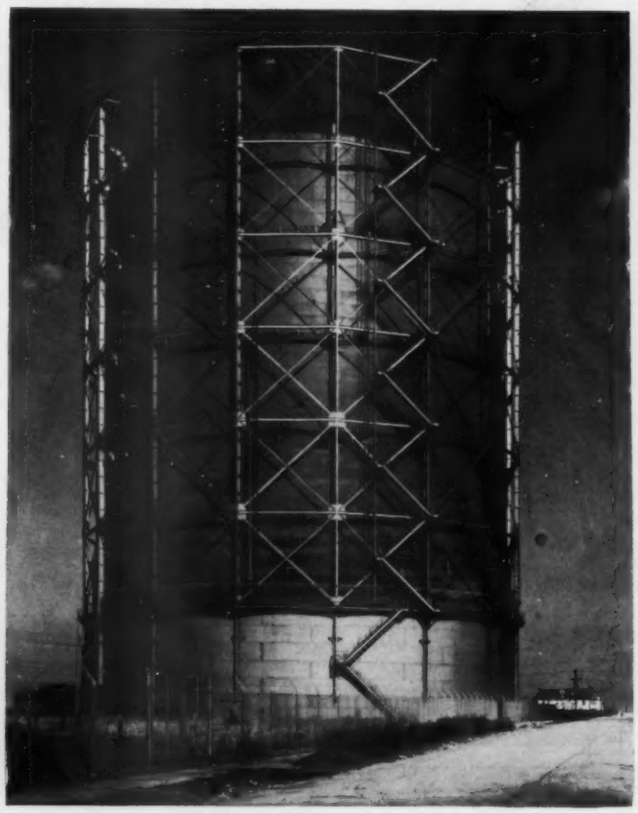
OF LARGE VOLUMETRIC CAPACITY EITHER IN THE HORIZONTAL OR VERTICAL TYPES

GAS PLANT EQUIPMENT

OF *STACEY* HOLDERS
SEVEN YEARS







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GAS HOLDERS-PURIFIERS

STURDY
CONSTRUCTION PAYS

A Gas Holder Is A Sturdy Structure

TWICE

our

Porto Rico Holders

and

Miami, Fla., Holders

Were In the Path of the Hurricane

Much damage elsewhere

None to the Holders!

BOOTH 41

INTEGRITY
FAIR **C-K CO** DEALING
SERVICE

CRUSE-KEMPER CO.
AMBLER, PA.
ENGINEERS & CONTRACTORS
BUILDERS OF STURDY GAS HOLDERS
PURIFIERS, SCRUBBERS, CONDENSERS, TANKS, ETC.

Rapid Temperature Readings

Pyro Radiation Pyrometer gives Quick and Accurate Temperature Readings in Gas Retort Benches, Gas Generators, Coke Ovens and Furnaces of all types.

Pyro Radiation Pyrometer
Weight 25 oz., Length 7 in.
Temperature Range 1000°-3600° F.

This handy, self-contained instrument has no batteries or attachments. Look through it at any point in a retort, generator, oven or furnace, press the button and the dial gives an instant and accurate reading of the temperature AT THAT POINT,—

Speed!

In a practical test on Gas Retorts, 280 readings were made and recorded in less than three and one-half hours,—equal to a reading every forty-five seconds. No guesswork, no calculating, no chance for errors.

The Simplified Pyro Optical Pyrometer

Absolutely Self-Contained

A further advance in Pyrometry

Gives a direct and accurate temperature reading on small and large objects or zones at any distance. Normal range of temperatures F1400-3000° F.

Readings show direct on the scale. No calculations necessary. Anyone can use and test it.

This new and simplified instrument is entirely self-contained and weighs but three pounds. Furnished with leather carrying case and strap.

Pyro Pyrometers of the Insertion, Radiation and Optical types are used in thousands of industrial plants the world over.

See demonstration of these two instruments at the Convention of American Gas Association.

Booth 206 -- Block C

or write for Bulletins

The Pyrometer Instrument Co.

52 Howard St.. New York

STREET DE
SUPPLIES - PI

When shutting off street mains, the safest and surest way is to use the GOODMAN STOPPER.

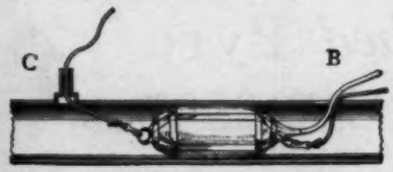
LOOK FOR THE SLEEVE LOCK

GAS MAIN BAGS

Type A—Seamless

Type B—Reinforced Seam

Type C—Canvas Covered



GOODMAN CYLINDRICAL STOPPER
(for intermediate and high pressures)

On intermediate and high pressure gas lines the Stopper is pulled into place and held with cable while being inflated.

OUR METHOD OF INSERTION TAKES LESS THAN A MINUTE

OTHER PRODUCTS

Air-Line Masks
Bags, Rubber and Canvas-covered
Brushes, Pipe-Cleaning
Expansion Plugs
Joint Runners
Mittens and Gloves
Safety Service Plugs
Soft Wood Plugs
Soap Tape
Binding Tape
"U"-Gauges, portable and stationary
Reurut High Pressure Service Cleaners

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Maintenance Engineering Corp., Houston, Texas.
Eastern Service Co., Boston, Mass.

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1897

SAFETY GAS MA

Established 30 Years · 523 ATLANTIC AVE

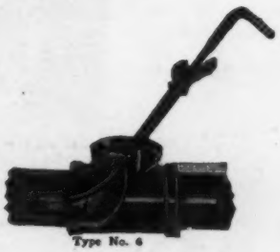
PARTMENT
PE GANG TOOLS

TESTING PLUGS FOR ALL PRESSURES

Type A

Type B

Type C


Type No. 6

Air Line Mask

With or without Blower. Mask and Blower in separate cases. Blower will supply sufficient air for four masks.

Our New Catalogue Is Now Ready

SOAP TAPE

Safety Gas Main Soap Tape for bandaging broken pipe. Also Binding Tape to cover soap tape bandage.

This is a picture of our canvas-covered gas main bag, Type C. Note that it is inflated to 5 lbs. internal pressure. It will hold against a pretty good pressure in the line.

Use this Type of bag in mains coated with tar or oil, or wherever a plain rubber bag will not hold.

The canvas partially protects the rubber from the effects of tar or gas liquor and permits inflation to a higher pressure. On small sizes, these bags may be inflated up to 10 lbs.

Be Sure to See Our Exhibit

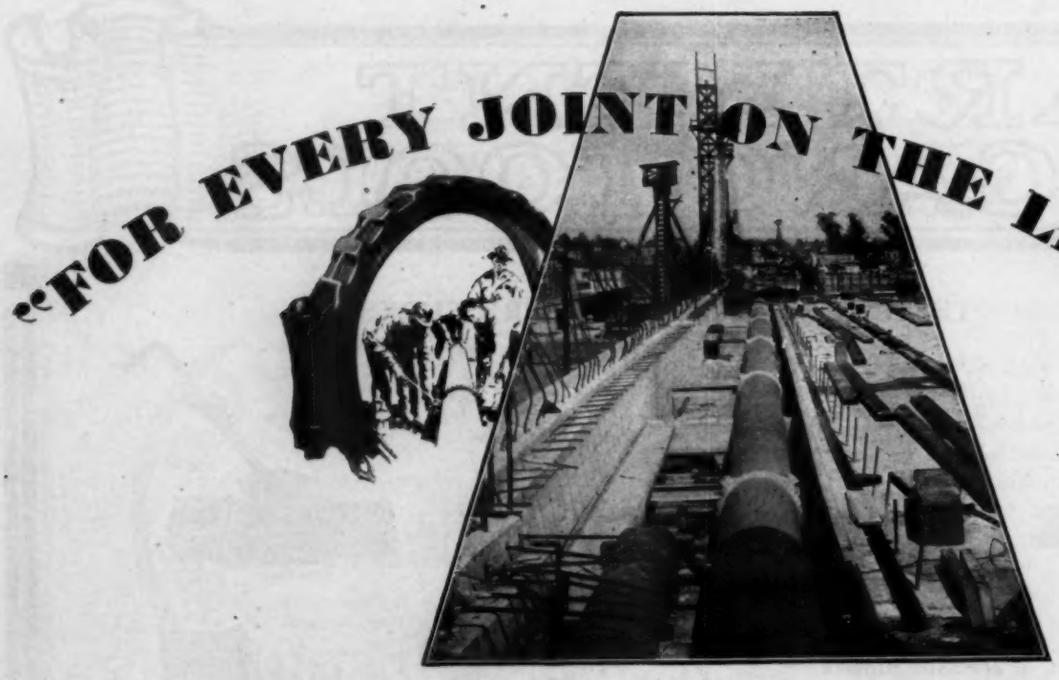
Booth 52

A.G.A. Convention

IN STOPPER CO.
NUE BROOKLYN, N.Y.

Cable Address
Gastopper, N.Y.

1928



VICTAULIC COUPLINGS

Victaulic Couplings were selected for the bridge section of the 16 inch gas main across the new First Street Bridge, Los Angeles

For detailed information on Victaulic Couplings and list of users and uses fill in the coupon and mail.

—because vibrations cannot loosen the joints and cause the line to leak

—because contraction and expansion of the pipe lengths are taken care of at each coupling and rise and fall in line temperature does not lead to strain and distortion of the line

—because the use of Victaulic Couplings cuts down the time and labor costs of installing

—because Victaulic Couplings assure leak-proof joints for the life of the pipe.

Victaulic Couplings are supplied for all pipe sizes from ¾" up, for steel, wrought iron and cast iron pipe—for all pressures from vacuum to 10 tons pressure per square inch. Victaulic Fittings make it easy to connect a Victaulic coupled line to any type of exising line.

VICTAULIC COMPANY OF AMERICA
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Minneapolis, Minn.

Distributors for Illinois, Indiana
BELL & GOSSETT
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The All-purpose coupling "For every joint on the line"

FLEXIBLE LEAK-PROOF
VICTAULIC
REG. U. S. PAT. OFF.
PIPE COUPLINGS

VICTAULIC COMPANY OF AMERICA
26 Broadway, New York
Please send Victaulic Bulletin No. 7.
Name. .....
Address .....

FOR CRUDE OIL — GAS — WATER — SEWAGE — COMPRESSED AIR, ETC.

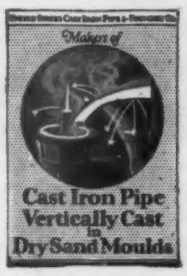
Eight-inch Anthony Joint deLavaud gas pipe line suspended on bridge across Colorado River at Austin, Texas

To reduce installation costs Anthony joint pipe is available in 24-ft. lengths made up of two standard lengths welded and tested under ideal conditions at our plant

No leaks occur in *this* bridge crossing

EACH year there is added proof of the soundness of deLavaud cast iron pipe with the Anthony joint for gas and water service. The Austin Gas Co. installed the 8 in. deLavaud main illustrated above in 1926. Where this line crosses the Colorado River Bridge, conditions are unusually severe, due to peculiar strain and constant vibration. That leakage has never developed is practical evidence of the great tensile strength of deLavaud pipe and the flexibility of the Anthony joint.

In modern high-pressure gas lines this type of installation has proved widely satisfactory. Under daily pressures of 90 to 125 lbs. leakage can be practically eliminated. DeLavaud pipe gives pressure-proof tightness, combined with ease of installation, and the age-defying economy of good cast iron.



MAY WE SEND YOU LITERATURE COVERING USES and LATEST SPECIFICATIONS OF DeLAVAUD CENTRIFUGAL PIPE

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Pittsburgh: 6th & Smithfield Sts.
Dallas: Akard & Commerce Sts.
Kansas City: 13th & Locust Sts.
Seattle: 1st & Marion Sts.
Minneapolis: 6th Street & Hennepin Avenue

SERVICE DATA FOR PROTECTIVE PAINT USERS.....CASE NO. 5

A great building insures for future generations with *Dixon's* **PAINT**

Over a corner of the office of J. P. Morgan at Wall and Broad Streets, New York City, the New Equitable Trust Building rises 542 feet above the street level. From both architectural and engineering viewpoints, this pile has design and construction details of unusual interest.

Of importance to all who have an iron and steel protection problem to solve was the practice followed of painting the steel girders in this building with *Dixon's Silica-Graphite Paint.*

The same assurance of extra years of usefulness and consistently lower maintenance costs that prompted the builders of the Equitable Trust Building to use Dixon's Silica-Graphite Paint has influenced untold numbers of industrial plants, railroads, chemical works, and the like to use this same effective paint film to resist rust, corrosion and process deterioration for more than 65 years.

Dixon's Silica-Graphite Paint is made in 6 colors—also Red Lead Graphite Primer, and Aluminum Graphite — but in only *one quality*—the best. It cannot crack or "dry out." It is impervious to moisture, and is strongly resistant to heat and chemical corrosion. It is equally efficient as a protector of wooden, iron and steel structures.

The value of a paint job is in the extra years of service it delivers.

Many people have become reconciled to the idea of repainting every two or three years, and accept this expense as a necessary contribution to Old Man Corrosion. Yet throughout industry are Dixon's painted jobs 6 . . . 10 . . . 12 . . . 15 . . . and even 20 years old which prove the economy of buying long life in every paint can.

And, Dixon's costs no more!

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Adequate Protection at Minimum Ultimate Cost

For Refractory Construction and Maintenance

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REFRACTORY CEMENTS

Our engineers have made a special study of refractory requirements in gas plants, including benches, horizontal and vertical retorts, oil and water gas sets, coke ovens, boilers and industrial gas fired furnaces. R & E No. 3000 is now being used by many gas plants for construction and maintenance work in gas equipment and in the boilers of gas plants. Tests in a soaking heat show that it stands 3050° F. before softening.

R & E No. 3000 comes in plastic form ready for immediate use and can safely be used for construction and patching work where temperatures do not exceed 3000° F.

Several months ago we patched a gas retort with R & E 3000, filling a hole 18" x 42." Several other cements had been tried on this repair job but all failed. Our patch with R & E 3000 is still there.

When used as a wash coat on old or new brick work, it lengthens the life of the setting by preventing penetration of the brick surface by the products of combustion. Clinker "bars-off" easily when this wash coat is used on any gas equipment or furnace structure.

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We maintain a well equipped laboratory for practical refractory tests and have a staff of technical experts with wide experience in refractory construction and maintenance.

Special Cements. Where unusual conditions are to be met we are prepared to furnish special cements, wet or dry, which will give you long and satisfactory service.

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THE "DRI-GAS" PROCESS

Patent No. 1614347

Typical Installation of a "Dri-Gas" Plant.

21 Plants at Work or Under Construction

In all cases where Plants have been at work for periods of from six months to two years, there has been a considerable reduction in the number of consumers' complaints.

HOLMES COMPANY

BOOTHS 47 and 48

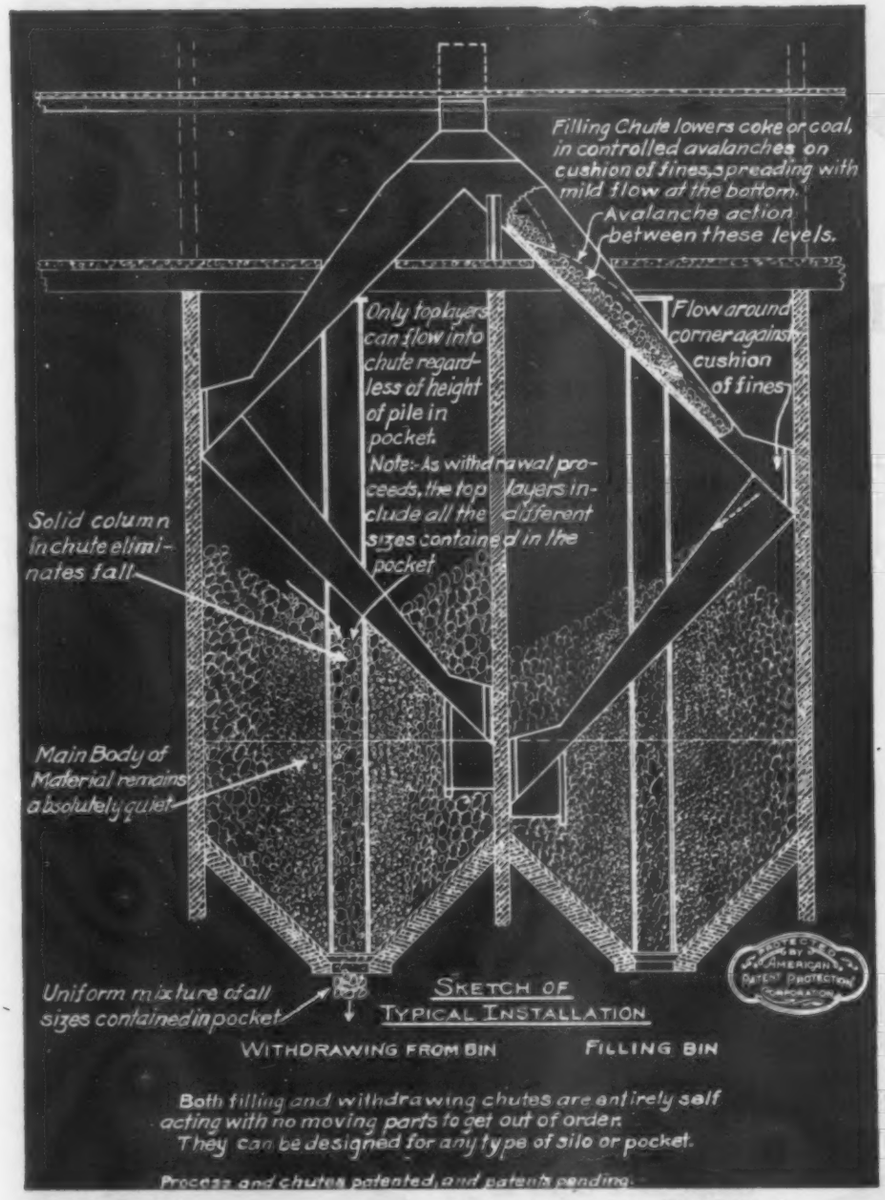
WEST GAS IMPROVEMENT CO.

Builders of Coal Gas Plants

441 Lexington Ave. New York.

Reduce Coke and Coal Breakage

and obtain Uniform Mixture of Sizes *at the Same Time* with the ADAMS PATENTED PROCESS and CHUTES


Filling Chute lowers coke or coal, in controlled avalanches on cushion of fines, spreading with mild flow at the bottom.
Avalanche action between these levels.
Only top layers can flow into chute regardless of height of pile in pocket.
Note:-As withdrawal proceeds, the top layers include all the different sizes contained in the pocket
Flow around corner against cushion of fines
Solid column in chute eliminates fall
Main Body of Material remains absolutely quiet
Uniform mixture of all sizes contained in pocket
SKETCH OF TYPICAL INSTALLATION
WITHDRAWING FROM BIN
FILLING BIN
Both filling and withdrawing chutes are entirely self acting with no moving parts to get out of order. They can be designed for any type of silo or pocket.
Process and chutes patented, and patents pending.

One of the largest Gas Companies in the world has installed the Adams Patented Process and Chutes in various different plants.

Three years of daily use and countless tests have proven conclusively the important position which this Process has earned in the Gas Industry.

The Adams Patented Process reduces breakage caused in handling coke or coal through bins to an absolute minimum and at the same time obtains a uniform mixture of all of the sizes contained in the bin.

Acknowledged to be one of the most valuable developments recently presented to the industry.

Constitutes not only a great money saver in the manufacture of water gas and in the handling of domestic coke but eliminates the coke consumers complaint in regard to fines and their uneven distribution.

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LAVINO OXIDE

FOR GAS PURIFICATION

Compare

IMPROVED LAVINO OXIDE

WITH ANY OTHER PRODUCT
FOR PURIFICATION

Improved Lavino Oxide excels in these features

Instant Pickup
Long period between changes
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Length of Life
Behavior under abuse or over loading
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Supplied for mixing at your plant
or
Grade A Sponge for Coal Gas
Grade B Sponge for Water Gas

See our miniature purification plant in operation at the Convention
Booth 56

E. J. LAVINO AND COMPANY, BULLITT BLDG., PHILADELPHIA, PA.

New York, 110 East 42nd St.
Chicago, 208 S. LaSalle St.
Pittsburgh, Oliver Bldg.

HYTEMPITE

Reg. U. S. Pat. Off.

ASK any Gas Plant Superintendent what he thinks of Hytempite,—"The Universal High Temperature Cement." Ten to one he'll say they have used it for years and get excellent results.

Hundreds of Gas Companies use Hytempite because it

INCREASES the life of Refractory Linings
REDUCES Costly Repairs and Shutdowns

USED ON CONSTRUCTION and REPAIRS FOR

Linings in Generator, Carburetor and Superheater
Linings for Flues and Valves
Boiler Settings Boiler Baffles Coke Ovens
Gas Retorts Gas Benches Gas Producers
Special Shapes and Tile
Gas Fired Furnaces
Etc.

HYTEMPITE makes a thin joint between brick or block that retains its strength at highest working temperatures in Gas Plant operation.

Many notable repair jobs are constantly being made by "shooting" Hytempite mixtures with the Quigley Refractory Gun.

Here's what the Springfield Gas & Electric Company thinks of the Quigley Refractory Gun:—

"Beg to advise that the Quigley Refractory Gun purchased and received from you last November has been used quite often since that time for the purpose of filling up small holes and cracks and building up low places in the furnace walls and arches of our high pressure steam boilers.

"A thin layer of material can be put on in a very satisfactory manner with your machine, and *we are very much pleased with it.*"

HYTEMPITE has solved many refractory problems in Gas Plants. What is yours?

QUIGLEY
FURNACE SPECIALTIES CO.

26 Courtlandt St. NEW YORK

Stock and Service in more than 100 industrial centers the world over.

HYTEMPITE is a Quigley Product

APPROVED BY A·G·A·LABORATORIES

Four reasons why

Service . . . .
ample and pleasing

Efficiency . . .
low operating cost

Durability . . .
low yearly ownership cost

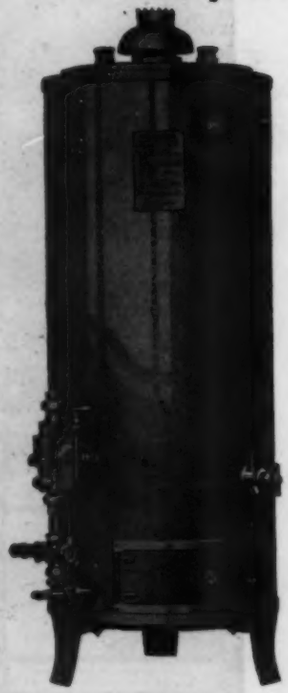
Safety . . . . .
that is complete

Superior Investment Value and Salability

in the

HUMPHREY KALAMAZOO

Automatic Storage Water Heater



1. SERVICE

It gives abundant, unfailing service. Simply turn a faucet anytime, day or night, and you get Hot Water, not an excuse.

2. EFFICIENCY

Less gas is required to heat the water and keep it hot. That means lowest operating cost.

3. DURABILITY

"Built for Lasting Service"—means low yearly ownership cost.

4. SAFETY

Safety pilot control that automatically shuts off all gas should anything go wrong. That takes away any possible chance of accident from escaping gas. Automatic pressure relief valve. No chance of boiler bursting from over heating. Snap thermostat for temperature control.

Superb design and construction at very low price, plus equally effective advertising material, plans and sales cooperation, recommends this for your investigation and adoption to secure good profitable volume business.

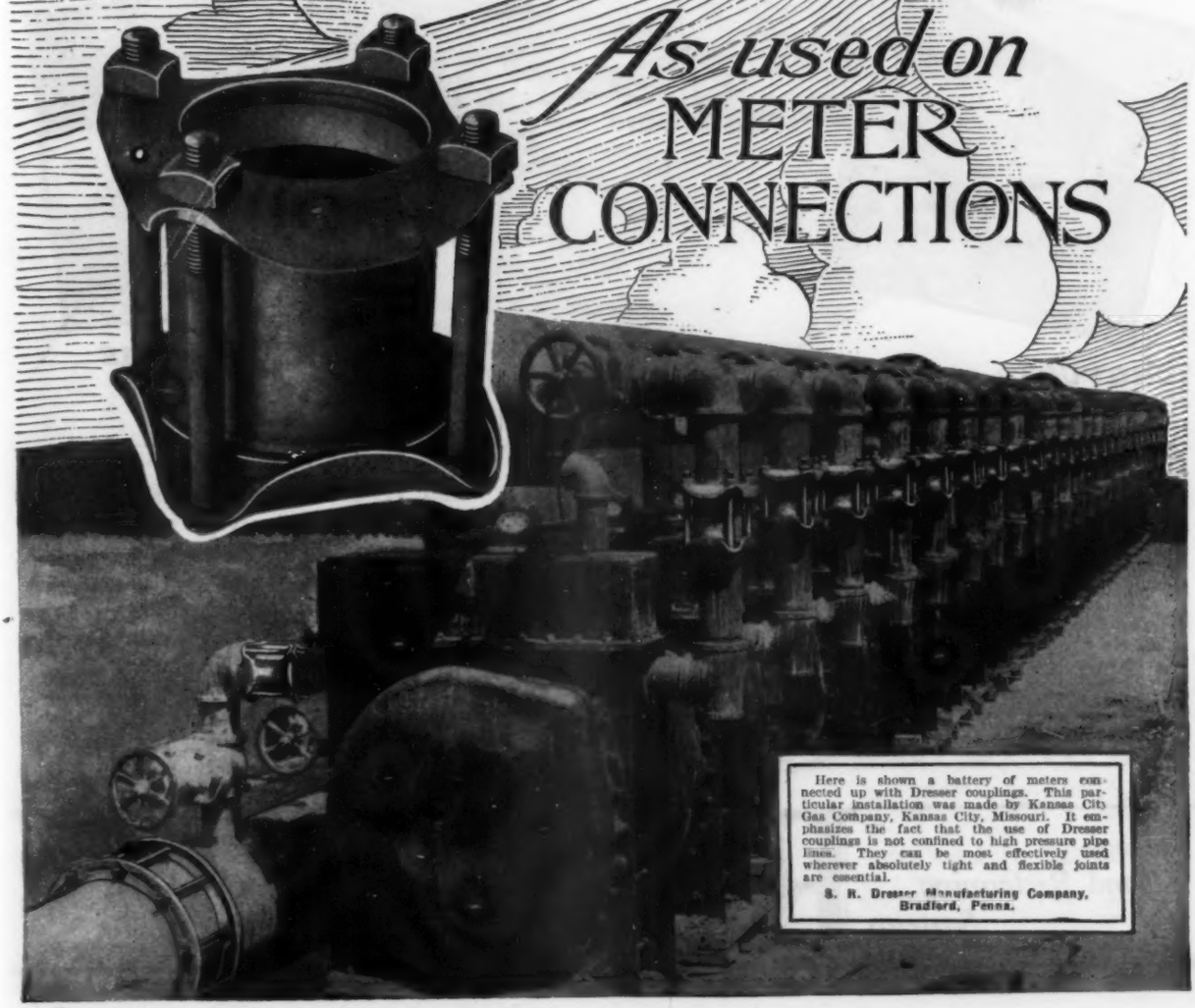
For unlimited hot water service, use the peerless Humphrey Instantaneous Automatic Heaters. Many sizes. One quality.

HUMPHREY COMPANY

Kalamazoo, Michigan

DRESSER COUPLINGS *Dominate!*

As used on METER CONNECTIONS



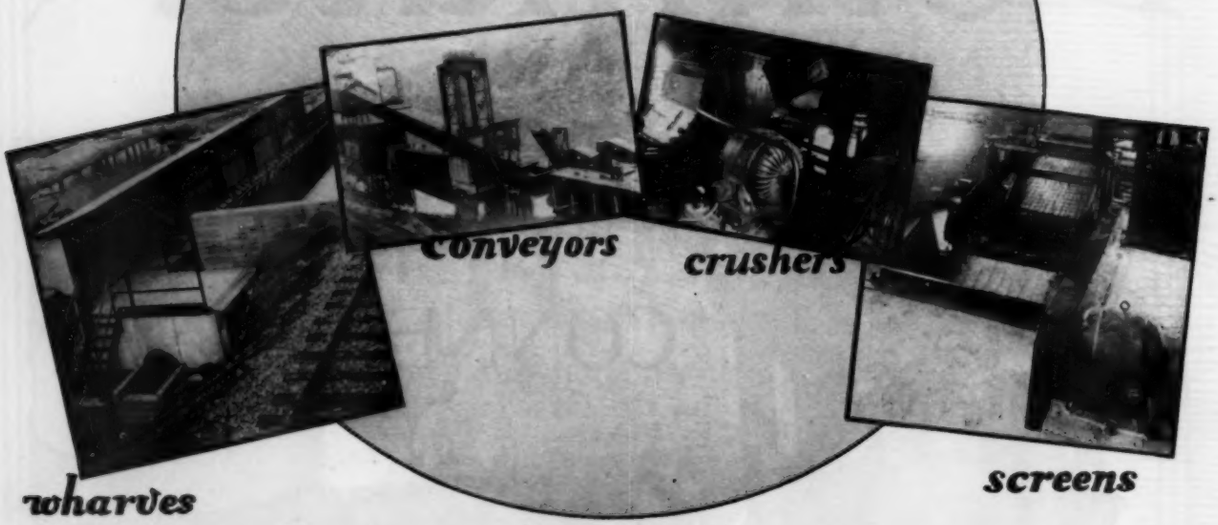
Here is shown a battery of meters connected up with Dresser couplings. This particular installation was made by Kansas City Gas Company, Kansas City, Missouri. It emphasizes the fact that the use of Dresser couplings is not confined to high pressure pipe lines. They can be most effectively used wherever absolutely tight and flexible joints are essential.

S. R. Dresser Manufacturing Company, Bradford, Penna.

For Handling Coke *PROPERLY*

cool ~ carry ~ crush ~ screen

by means of ROBINS



In Booths 225 and 226 at the Atlantic City Convention the Robins Company will exhibit some of its conveying and screening equipment.

THE word "properly" is emphasized for this reason—most of the largest coke and gas plants, noted for their efficiency, use this same Robins equipment. Coke is properly handled in these plants.

For extensions to or changes in your present plant, any equipment that you would order would be the same that is included in complete plants of Robins design. This assures proper handling.

And if your requirements involve problems of engineering, we will be glad to assist you. If machinery only is needed, your order will be given prompt attention.

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15 Park Row, New York, N. Y.
Chicago Boston Philadelphia Pittsburgh Los Angeles
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Storage and Reclaiming Systems

MATERIAL HANDLING
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EQUIPMENT

Conveying Crushing Screening

SUPERIOR

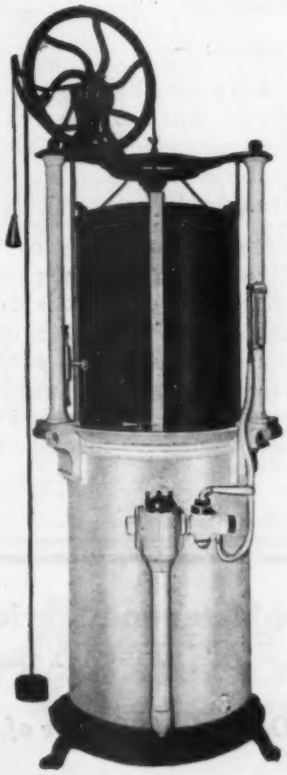
Gas Meters
Provers
Service Cleaners,
Diaphragms

BOOTH NO. 9

A.G.A. Convention Atlantic City

In attendance:—

John H. Walsh,
Jay M. Grady,
Thomas Martin,
W. P. Smith.



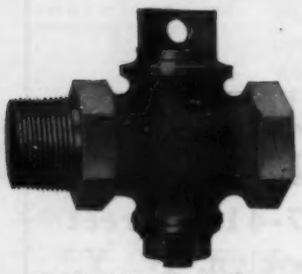
SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

KITSON
BUILT FOR SERVICE

G-515—Iron Body Gas Cock, Lock Wing, with Brass Key

G-315—Flat Head Key

G-301—Flat Head Key



G-211—Flat Head Key

KITSON COMPANY

INCORPORATED IN 1897

EXECUTIVE OFFICES

261 N. BROAD STREET

Philadelphia, October 1, 1928.

To the
Public Service Companies
of America

Attention ''Gas Division''

Gentlemen:--

Will you kindly advise when you contemplate calling for quotations for your 1929 requirements of Gas Meter and Service Cocks?

The Kitson Company would be pleased to fill a portion of your orders, at the lowest figure consistent with quality. If you will favor us with an outline of what you will need, we will be glad to submit prices for your consideration.

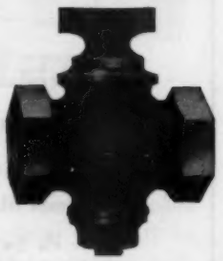
KITSON CO.

Makers of Meter and Service Gas Cocks for Thirty Years

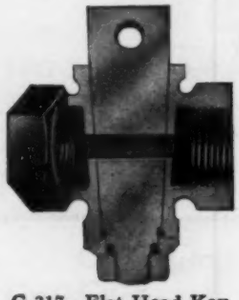
A Dependable Source of Supply

G-205
Squarehead Standard

G-215
Lockwing Standard



G-203
Tee Head Standard



G-317—Flat Head Key
High Pressure Cock

District Representatives: Baltimore, Chicago, St. Louis, Boston, Cincinnati, Cleveland. San Francisco, Pittsburgh

WE INVITE YOU
to View Some
Important Advances
In Gas Control
at Booth 121
Oct. 8th to 12th
A.G.A. Show
Atlantic City

Reynolds
Gas Regulator Company
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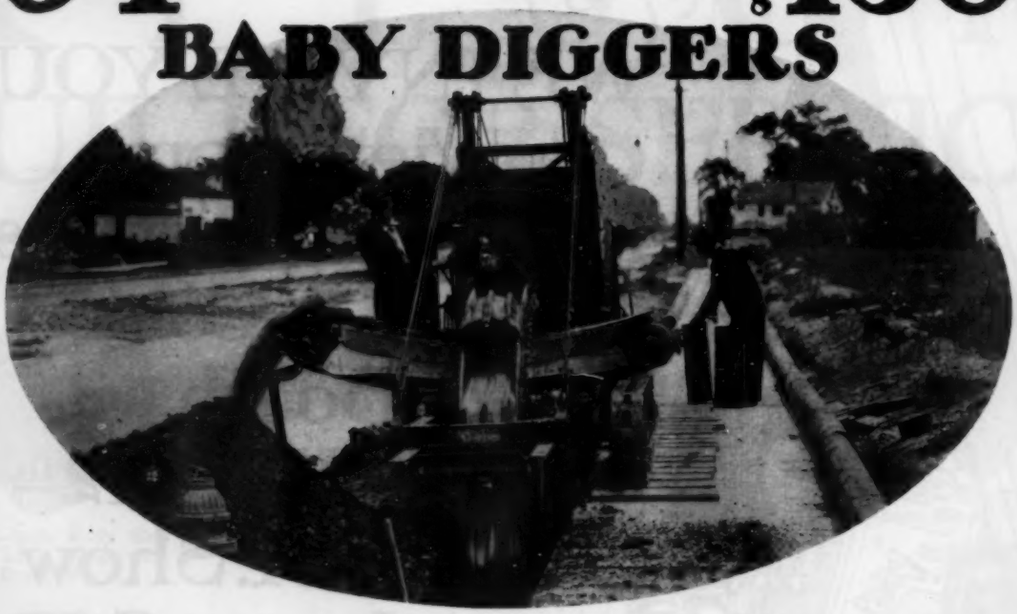
Thos. C. Corin, Detroit, Mich. Gillespie & Schwan, Inc., Dallas, Texas

64 Large Gas Companies are Using 130 BABY DIGGERS



A PROVEN and tried machine The Baby Digger has demonstrated to these progressive public service corporations in the Gas Industry that machine digging on their small classes of work is not only possible but is the most practical, efficient and economical method of trench digging.

THERE'S A REASON

The Baby Digger is small, compact and easily handled, operating in very limited working spaces. Rugged and powerful, it produces a maximum footage in the toughest, hardest soils. Extremely mobile, it is easily moved from location to location at truck speed.

Install a Baby Digger! Watch your trenching costs go down!

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Pioneer of the Small Trenches

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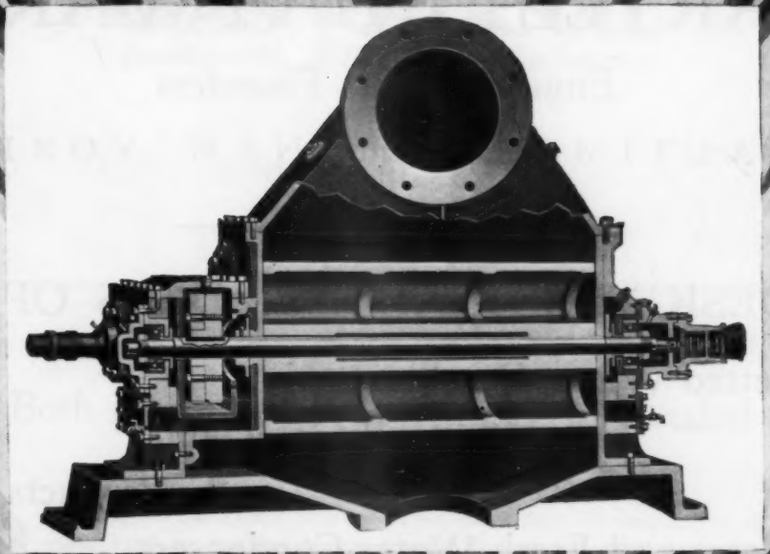
THE BABY DIGGER

See us at the Philadelphia Convention, Booth 444-445-446

ROOTS



Inspect the new ROOTS Mete
at the A. G. A. Show, Atlantic City,
October 8th to 12th
Booths 71 and 72

The NEW ROOTS METER

The P. H. & F. M. ROOTS CO.
CONNERSVILLE, INDIANA
CHICAGO
Peoples Gas Building
NEW YORK
120 Liberty Street

Originators of the Double Impeller Rotary Principle

The BARTLETT HAYWARD CO.

Engineers and Founders

BALTIMORE and NEW YORK

DESIGNERS AND BUILDERS OF:

Carburetted Water Gas Plants
Complete Coal Gas Plants
By-Products Plants
Salt Water and Fresh Water Condensers
De Brouwer Charging and Discharging Machines
Purifiers - Steel Tanks - Shaving Scrubbers
Vertical Waste Heat Boilers
Gas Holders

View of Main Plant, Located at Baltimore

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900

HENRY M. RILEY, *Editor*

Both Brains and Machines Are Needed

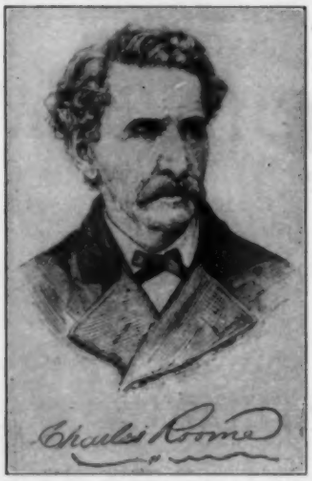
THE GAS INDUSTRY has ever been dependent on mechanical devices of one kind or another but the past decade has seen truly remarkable advancements in this regard.

Many of us still active in the industry, can vividly recall the vast expenditure of muscular effort incident to the all-important business of supplying half the nation's population with the cleanest, most flexible fuel yet devised. Still green in our memory are pictures of mighty-thewed workmen pushing generously laden coke buggies, wrestling with ponderous blistering valve wheels, carrying weighty burdens of pipe and other materials and digging into the earth with hand wielded implements. But, in common with other industries, we are fast emerging into an age of mechanization. Power driven equipment is supplanting muscular effort in the operation of the works, the distribution system, and even in the accounting office.

The current issue, devoted almost exclusively to the theme of MECHANIZATION, is but small evidence of the important trend in this direction.

SOME observers, noting the rapid introduction of machinery in industry, have said that brains are no longer needed. They have argued that machinery is replacing mental effort. That is not the fact. Machinery replaces muscular effort—and what is more important, it frees the brain from deadly routine and enables it to function, as nature intended, for thinking purposes.

BRAINS functioning freely along new lines are still the great need of the gas business. We are far too prone to continue in the way of our predecessors. Automatic and mechanical operation is important for every branch of the business, but the very best of today is far from ideal. The mechanical engineers can further improve the mechanisms now used, and the chemical engineers must study and better the processes. It is something of an achievement to have replaced brawn with power; but it will be a still greater accomplishment when brains and power functioning together give us further modified and improved methods throughout the industry.



By Robert E. Livingston,

Director of Information, Consolidated Gas Company of New York.

NO one has ever considered, much less claimed, that any of the associations devoted to the gas industry was or had been founded on militaristic lines, or, purposeful as they were and are, that they really smothered an inclination toward howitzers, smokeless powder, epaulets and side-arms.

But this very month—October—we might stop for an instant to look at one of Time's milestones on which we see that it is exactly fifty-five years since the Gas-Light Association of the United States had its first meeting. It was a momentous occasion, because men identified with the gas industry met to discuss the gas business as they then knew it, and broke bread together in that famous and illustrious caravansary, the Astor House, in New York City, now a thing of the past, like many another.

That meeting was held on October 15 and 16, 1873. And now the peculiar coincidence! General Charles Roome presided as president of the newly formed Gas Light Association. General Roome was then identified with the old Manhattan Gas Light Company in New York City. The latter company passed out of existence in 1884 when the Consolidated Gas Company of New York came into existence, and General Roome was elected the first president of the Consolidated Company in November, 1884, and held that office until November, 1886. This month, fifty-five years after the organization of the old Gas Light Association, Colonel Oscar H. Fogg, a Vice-President of the Consolidated Gas Company of New York, will enter upon his second term as President of the American Gas Association. Truly, the Association is not militaristic, but it is a militant body in the field, unselfishly fighting for a service and appliances for the common good of men and womankind of our country, that the best of both may be theirs.

Colonel Fogg organized the Consolidated Gas Company's Department of Utilization and was appointed Engineer of Utilization in 1912, and five years later we find him in the military service during the World War. He engaged in the design of plants for repair and maintenance of ordnance material in France and recruiting, organizing and training of enlisted and commissioned personnel. During his service in France, Colonel Fogg was promoted to the rank of Lieutenant-Colonel, and for exceptionally meritorious service he received the French decoration of the Ordre de l'Etoile Noire and, subsequently, the Distinguished Service Medal of the United States Government.

The Colonel's predecessor, General Roome, enlisted in Company D, Seventh Regiment, New York City, in 1831. Thirty years later he organized the Thirty-seventh Regiment of New York State militia and was commissioned its first Colonel. He commanded that regiment at Baltimore, Md., in 1862 and in Pennsylvania in 1863. He resigned in 1864 and was brevetted Brigadier-General of Volunteers by the President in 1865. He entered the service of the old Manhattan Gas Light Company in 1837 as a clerk and became president of the Manhattan Gas Light Company in 1854.

Here we have shown that the president of the Consolidated Gas Company of New York resigned an army career fifty-three years before a Vice-President of the same company took up a similar career in the World War, and both served their country with honor. We emerge from comparisons and begin to consider contrasts.

General Roome when he relinquished the presidency of the Consolidated Gas Company, looked upon a city (comprising, as it does to-day, five boroughs) with a population of 1,911,698 instead of the one of to-day with more than 6,000,000 citi-

Astor House, New York, where the first American Gas Convention was held in 1873

zens. There was talk of "horseless carriages" but no one had seen an automobile and gas lights were flickering on streets and in homes. A gas range was a luxury and cost as much perhaps as a fairly good but "used" motor car to-day. No one would have had the audacity of mentioning to General Roome that ice was to be made by gas, for the Bloomingdale (Insane) Asylum was then nearby on Manhattan Island. Balloons were floating in the air at country fairs, but the "heavier than air" machine had never made such a roar that office workers became disturbed and added up columns of figures and got wrong results. The industries had not become wedded to gas fuel and city streets were filled with coal carts and eyes and ears of pedestrians were filled with coal dust and soot from smoking chimneys. General Roome's old military clothes would have been shaken off his body from laughter had any unthinking man told him that a building was to be heated by gas and that gas would provide families with all the hot water necessary, not only for a family, but for a house full of guests.

Times have changed and Philadelphia, Chicago, Denver and even San Francisco have become New York's suburbs, so far as time is concerned. Even the telephone was in its infancy, and when General Roome had a "call" during the day it was a "real event", and undoubtedly the most important subject discussed at the dinner table that evening. Of course the most optimistic man in the Consolidated Gas Company's employ would never have dared to say, "General Roome, the day is coming when there will be a big

Oscar H. Fogg,
President, American Gas Association

American Gas Association and way out in Cleveland, out there in Ohio, they will have a testing laboratory, and ranges, burners water heaters and hundreds of other gas appliances will have to be tested and approved before the gas companies of the entire country will sell them to their customers."

Interpret as you will, hallucination or foresightedness, the evolution of the gas industry has brought all this and many other things about. Those of us who will be "mulled" about by the thousands of gas men at the tenth annual convention of the American Gas Association on the "Million Dollar Pier" at Atlantic City can bear witness of the strides that have been made during a comparatively few years. The exhibits tell a wonderful story and the various sessions, papers and discussions tell us of much more to come. Evolution is in the air and writes in large characters.

Many will hark back, however, to the days of the organization of the American Gas Association with Mr. George B. Cortelyou, President of the Consolidated Gas Company of New York, as its first chief executive officer, who also served a second term as president. Those were the days when the building of the foundation and the laying of the corner stone of a national institution such as the American Gas Association is, demanded much of the president and his fellow executives as architects and builders of an edifice for the housing of a work that will last for all time.

It was the genesis of a more impressive era and in marked contrast to the first convention held by the National Commercial Gas Association in 1907, and even the exhibition of that Association held in New York's old Madison Square Garden in December, 1909, which overshadowed all previous exhibitions of gas appliances.

Boardwalk Sky-line, Atlantic City, New Jersey

The Role of Mechanization in the Gas Plant

Automatic Control and Operation in the Gas Works

Ismar Ginsberg, B.Sc., Chem. Eng.

SOME of the most important developments in modern technology and industrial methods have been the application of instruments which enable the operator to control his operations without actually having to watch them in person, and of automatic machinery, which has enabled the plant to carry out its operations with the least expenditure for labor and with the highest technical efficiency. These instruments and automatic devices are found in great number in gas works.

This is not surprising when one takes into consideration the fact that gas making has never been, even in the very earliest days of the industry, a process which can be carried out in small apparatus. Large quantities of materials always had to be handled and the chemical reactions that took place have always been of such character as to necessitate strictest attention to physical as well as chemical conditions, if economy and efficiency were to be obtained. Gas making is of course a chemical process but of such nature that comparatively large machines had always to be used in its accomplishment. This is quite different from the common run of chemical operations.

Hence the operator of the gas works soon saw that he had to have the assistance of certain devices which would show him what was taking place within the various apparatus used in the works. Later on he found that he could very advantageously use instruments that would not only indicate but record the progress of these operations, and still later he found that he could do away with the labor required for watching certain of his operations by using devices which automatically controlled these operations.

Regulating or controlling instruments are made in various types and according to various basic principles. Thus they may be operated by means of air or electricity, or else they may be actuated by means of a fluid which they contain and which is caused to expand or contract by the rise or fall in the temperature.

Condenser Control

There are certain operations which carried out in the gas works which lend themselves very well to automatic control, and in which, when automatic control is employed, certain highly important advantages are gained. Thus in the purification plant we find that automatic control has been successfully applied to the operation of the condensers. The function of the condenser is of course to cool down the temperature of the gas, so that the ammonia contained in it is condensed and is removed. Furthermore, it is necessary to cool down the gas before it enters the tar extractor, so that the latter apparatus can effectively remove the tar that is contained in the gas. The one condition that is most important in this operation is the maintenance of a constant temperature in the gas after it leaves the primary condenser which is just ahead of the tar extractor in the purification system. The rate of flow of water through the condenser is of course a determinant factor in this operation, and while it is possible to control the flow by manual manipulation of the water valve, it has been found far more satisfactory from many standpoints to use automatic control for this purpose.

Automatic control of this opera-

American temperature controller, Citizens Works, Brooklyn Union Gas Co., applied to a Gas Condenser. This instrument automatically regulates the amount of water fed to the condenser and holds the outgoing gas at the correct temperature before entering the scrubbers

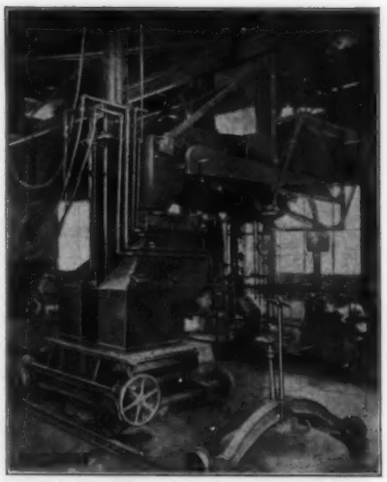
tion merely consists in placing the controller on the water outlet from the condenser, and the actuating bulb in the gas outlet leading from the condenser where it is subjected to average temperatures effects therein. The instrument is of the reverse-acting type, which means that as the temperature rises within the condenser, the water valve is opened to greater extent by the controller, while when the temperature drops, this valve is closed to greatest extent. The controller is adjusted so that it becomes operative at a temperature which is the temperature that the gas engineer selects as best for this purpose. This temperature is usually between 110 and 120 degrees F., for it is claimed that the tar extractor will produce the best results when the gas reaches it at about this temperature. It is the function of the controller to maintain the temperature at a predetermined point without variation. This it does in a very accurate and reliable manner. Savings are effected in labor, in the consumption of water, and not only is it assured that the condenser will operate properly but also that the tar extractor will be efficient, for under these conditions it will receive the gas under the best possible conditions for the removal of its tar content.

Automatic control can also be advantageously employed in the operation of the secondary condenser. The conditions affecting the use of the instrument in this case are similar to those described above for the case of the primary condenser, and the advantages gained from the use of the controller in this case are similar to the above.

Interesting Use of Controller

A very interesting use of the controller in the gas works is to regulate the temperature of the water in the cups of the gas holder. The water is ordinarily heated in a water heater of the usual type, but unless the heater is watched, a cold spell during the night might very well lower the temperature of the water to such a degree that it freezes in the cups. Hence it has been found advisable to place an automatic controlling device on the water heater so that the temperature of the water leaving the storage tank is such that freezing can not take place.

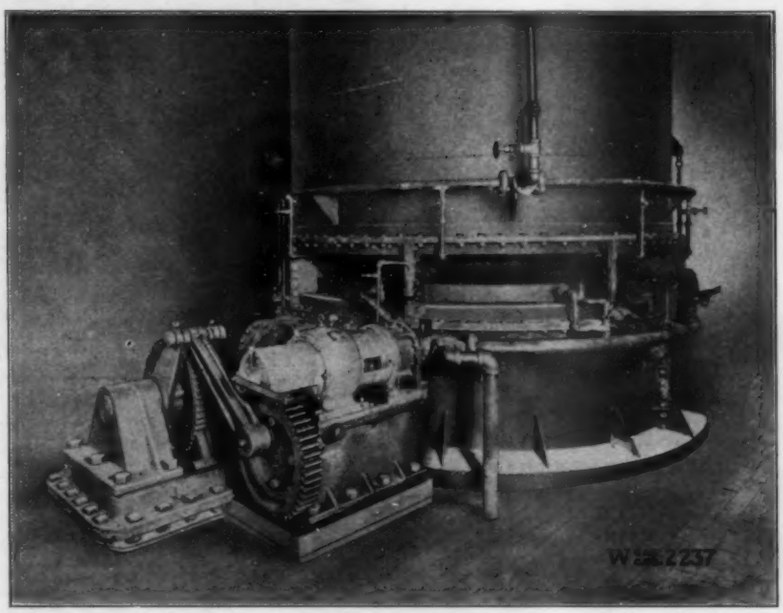
Automatic control can also be exercised in those cases where the water in the cups of the holder is heated by steam. In this case the controller is located on the steam line that feeds the cups. The thermostatic bulb of the regulator is placed at a proper position in the cups, being completely immersed in water. When the temperature of the water drops below a predetermined temperature, say 40 degrees F., the steam will be turned on and the temperature of the water raised until it again reaches 40 degrees F. whereat the steam is cut off. The automatic controller in such an installation saves labor and steam and assures the operator that the water in the cups will not freeze.



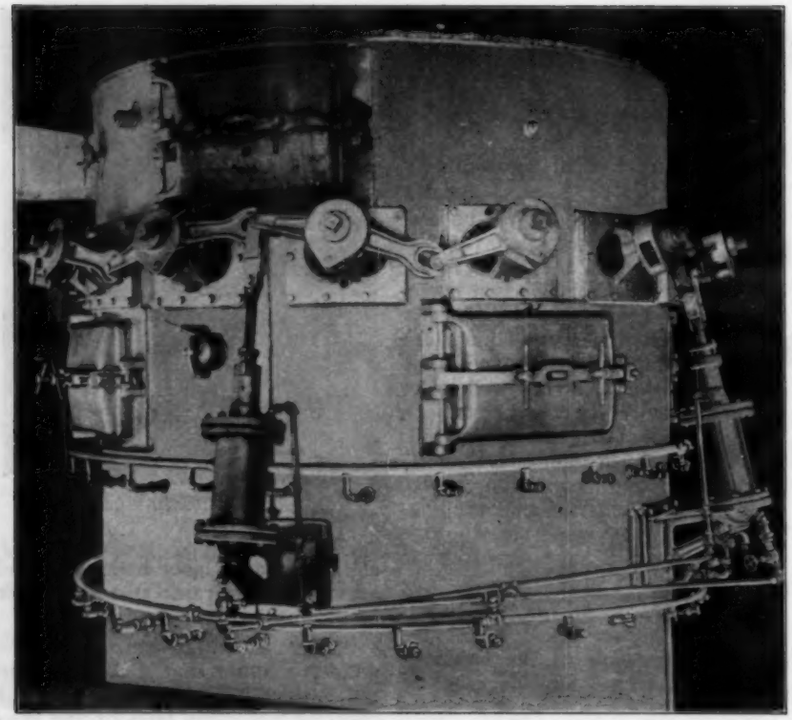
Howard Automatic Charger

Some gas works concentrate the ammonia liquor that is recovered in the purification of the gas. In this case the actuating bulb of the controller is located at the outlet of the still through which the ammonia vapor passes. The controller itself is placed on the steam line which enters the still. The temperature range over which the instrument may be adjusted is generally from 150 to 200 degrees F. Some suitable temperature between these two limits is selected as best for the operation and the controller will then regulate the operation in such a manner that just sufficient steam is fed into the apparatus to distill off the ammonia and leave the water behind in the still. Thus too much steam is not employed in the process and considerable labor is saved. It may be mentioned here that the most suitable type of instrument for this purpose is a controller which will regulate not only the steam in the still but the pressure of the steam to the still as well. A type of controlling instrument is made which operates so that pressure of the steam up to the temperature control valve is held at a set point. Then the temperature control element will simply draw up enough of this steam to keep the ammonia liquor at the proper distilling temperature. This instrument is a combined temperature and pressure controller.

Still another interesting use of temperature control in the gas works is in the dehydration of water gas tar. Water must be removed from



Western Gas Co. Self-Clinkering Generator Base



Steere self-clinkering mechanism

this tar if it is to be sold for useful purpose. Many systems are employed to accomplish this and one that is recommended is to heat the mixture of water and tar to a certain temperature and then pass it through a centrifuge so as to separate the tar from the water. The entire success of the operation, however, depends on the maintenance of a constant temperature of 175 degrees F. in the tar as it enters the centrifugal machine.

In order to be sure that this temperature is maintained at all times, a controller is placed on the steam line entering the tank in which the mixture of tar and water is heated. The bulb of the instrument may be located within the tank or it may be placed on the tar line leading out of the tank. This instrument will do away with the necessity of employing a man to watch this operation constantly, and it will be more reliable than the man himself, for it will regulate the temperature to within a degree or two of the desired point. The controller is highly essential in this operation to make sure that the tar-water emulsion is properly destroyed and a good grade of tar is obtained.

It might be mentioned that where a record of the operation, which is being automatically controlled, is of advantage in determining the output of the apparatus, etc., it is well to use a recording thermometer as well as the controller. The use of the two instruments in this manner represents the last word in instrument control, for the recorder will check up on the controller and will furnish a complete picture of the entire operation.

Self-Clinkering Grate

While controlling instruments are of prime importance amongst the labor-saving devices that are being used in gas works, they are not the only means that have been adopted to secure higher efficiency and economy in the gas making operations. It is impossible to go into detail in the description of all of these apparatus and devices, the various conveying machinery employed, the charging and dis-charging machines and the like, but some mention will be made of the self-clinkering grate used in water gas generators.

This very interesting development is related, in certain makes of water gas generators, with means for the elimination of the formation of clinker on the walls of the generator.

The adherence of clinker to the walls of the water gas generator can take place only when the temperature of these walls is such that the clinker does not fuse and stick to them. Hence if it were possible to reduce the temperature of the walls, clinker would not adhere to them. This has been done very effectively by allowing a thin stream of water to flow down the walls of the generator. Water is used for this purpose because it has a high latent heat of vaporization and a small amount of it will remove a large amount of heat and the temperature of the walls will be materially reduced and clinker adherence eliminated. Actual tests and large scale use of the method have proven its effective practicability.

The clinkering spray is furnished through a header which encircles the generator and feeds through outlets arranged within the shell of the machine. The water is absorbed as steam in the gas making process. The use of this spray is entirely independent of the gas making cycle. The water does not remove heat from the fuel bed but only from the hot walls of the generator. The clinker is made friable so that it is easily broken up on the grate.

There are more than one type of self-clinkering grate. Thus one type, known as the Steere Rolling Grate, is built in a number of segments each of which is rotated by hydraulic power. The rotation of the segments breaks up the clinker so that it is easily removed. There are fourteen of these segments, which are cone-shaped, arranged around the circumference of the water gas machine, forming the grate of the machine. It is possible to cause these segments to move in either of two directions and at three different

Detail of Steere Grate

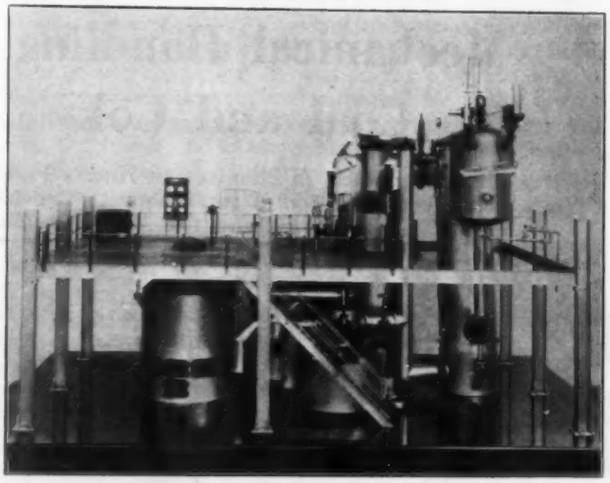
A FEW OF THE U. G. I's. CONTRIBUTIONS TO MECHANIZATION IN THE GAS MANUFACTURING

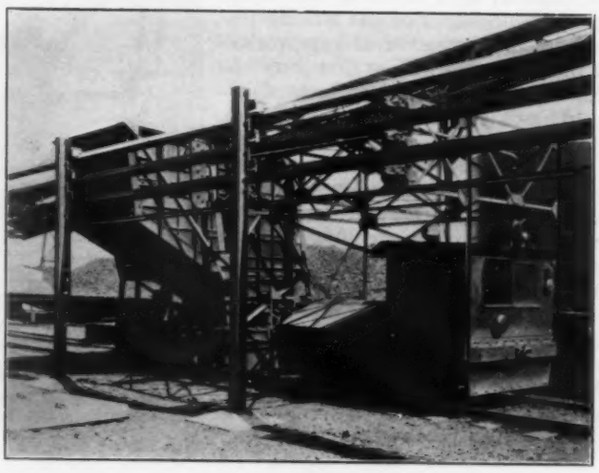
Right—Interior of Coke Screening Plant at Syracuse, New York, showing the shaking screens. This machinery not only saves time and labor, but delivers a high grade of clean and uniform coke.

Right Center—The modern U. G. I. automatically controlled Carburetted Water Gas apparatus, with Chrisman Cycle, Waste Heat Boiler and operated on Bituminous coal.

Lower Right— Hote Coke car and Electric Locomotive at Syracuse, New York.

Lower Left—Exterior of Coke Screening Plant at Syracuse, New York. Note the clean condition of ground surrounding the plant; making for comfort and safety for the workmen.





speeds. Simple control devices are furnished for regulating the rotation of the segments, and thus it is possible to rotate them rapidly on one side of the grate where heavy clinker formation takes place and not so rapidly on another side where the clinker is finer and more easily ground. In this manner the operation of the grate can be effectively controlled in all its details. Considerable saving in labor is effected, alone, by the elimination of the barring down operation. Other economies and efficiencies are also effected by the use of the water sprays and the self-clinkering device, the operation of the generator is improved, labor costs are reduced.

Another type of self-clinkering grate is the ABC apparatus made by the Western Gas Construction Co. This consists essentially of a grate over which a hollow, water-cooled, cast steel beam about fifteen inches high, rotates. A wave-like motion is given to the fuel bed by this beam. The device operates so that large clinker is not formed. The device may however be made rugged enough so that it crushes and eliminates the most obstinate clinker in case such is formed. Considerable saving in labor and higher efficiency in the operation of the generator are secured by these means.

A word may be said with respect to the use of the automatic charger on the water gas machine. One such type is the Howard Automatic Charger made by the Western Gas Construction Co. and another is made by Semet Solvay Engineering Corp. for their water gas machine. The first type is movable and moves over the floor charging one machine after the other. The second type is stationary, each machine being provided with one. In either case provision is made for prevention of leakage of gas during the charging operation.

Mechanical Handling of Coal and Coke

Fuel Handling Completely Mechanized in Hunt's Point Plant of New York Consolidated System With Elaborate Provision Against Interruption of Service and for Maximum Economy.

Editorial Staff Report

USE of the most modern types of auxiliary equipment is just as essential for economical gas works operation as is the installation of modern generators and modern ovens. It is not surprising, therefore, to find that equally careful attention has been given to the problems of coal and coke handling as to the problems of gas making itself in the largest coal-gas works of the Consolidated Gas Company of New York City, which is located in the Hunt's Point section of the Bronx.

This coal plant is of the latest type of Koppers-Becker 13-ton ovens, of which there are two batteries of 37 ovens each. The installation is fully equipped with a complete Koppers-type by-product system, including facilities for making Arcadian grade ammonium sulphate. Among the most interesting mechanical features of the plant is the fuel-handling conveyor system.

The coal is received at this plant in ocean-going steamers, usually with cargoes of 4,000 net tons. The unloading is direct from these steamers, moored at the company dock, by means of two coal bridges, designed by the Industrial Brownhoist Corporation of Cleveland, Ohio. A single 7-ton grab bucket of the clam-shell type is used on each bridge operated by a man-trolley which runs on the bridge. The bridges are on rails so that they can be moved along the dock front, accommodating their position to the requirements for operating through the hatches of the boats.

Coal on removal from the boat may be either placed in storage or sent at once into the works for use, according to the current requirements of the plant. If coal is to be stocked, it is dropped from the unloading grab bucket into the pier hopper from which it is discharged by a drag conveyor onto a belt conveyor which carries it back from the dock and discharges it onto a stock pile by means of a reversible hopper. Or the coal may be stocked directly from the boat into the area under the bridge by simple travel of the grab bucket back along the bridge over the stock pile closest to the water front.

On the other hand, if the coal is to be used directly in the plant, it is discharged from the pier hopper into a transfer car of 60 tons capacity which runs on the track along the dock front. From the car it is discharged into the pit which is the initial unit in the coal handling facilities of the plant proper. When a boat is not being unloaded, coal for plant supply is reclaimed from the stock supply by the grab bucket on the coal bridge, and returned to the pier hopper to follow the same course through the transfer car into the plant. Filling of this transfer car is controlled by its operator who

Coal bridges with man trolley grab buckets

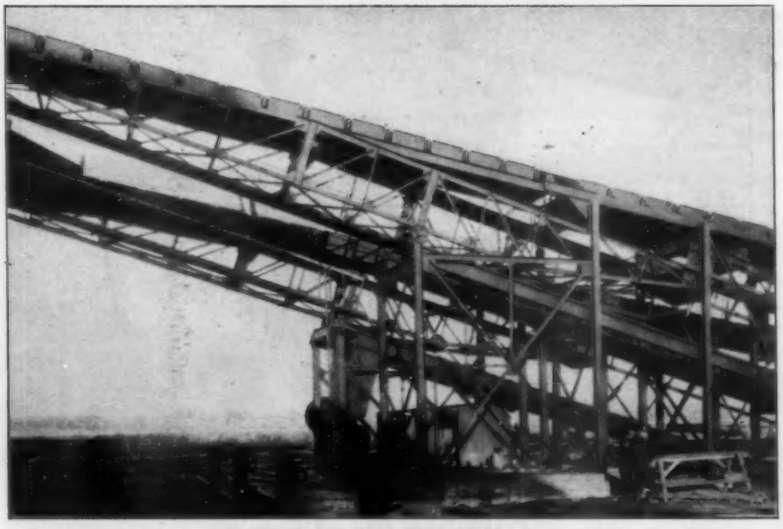
General view, showing coal and domestic coke pockets

loads his car at will by opening or closing the discharge gates of the pier hopper.

The discharge from the transfer pit is by a plate feeder system which delivers the coal onto a 72-inch apron conveyor, and that in turn delivers onto a 48-inch rubber belt conveyor. This system is operated at high speed, and has a capacity of 500 tons of coal per hour. Following the 48-inch belt is another of 52-inch width running in the same direction, and still another of like size running at right angles. The transfer of coal from one conveyor to the other at right angles is accomplished by a hopper device and is entirely automatic.

The final large coal belt conveyor delivers the coal through a split chute to the two Bradford breakers. The broken coal from the Bradford breakers drops onto two parallel belt conveyors which deliver it to a Pennsylvania Crusher Company hammermill. The refuse from the breaker is discharged to one side and transferred by a suitable conveyor to its storage bin. The crusher is operated by a 440-horsepower, 2,200-volt, 3-phase motor which delivers the coal crushed so that 80 per cent will pass a screen with meshes one-eighth inch square.

The crusher discharge is carried by a 42-inch belt conveyor to the top of the mixing bin tower, and delivered by a drag conveyor to the appropriate crushed coal stock bin. The coal from the various bins is mixed in the desired proportions by adjustable drop gates discharging onto three belt conveyors which deliver onto a single 42-inch conveyor. The amount of material taken from each bin is determined by the depth of the coal on the conveyor, and by the rate at which the belt moves. The discharge from the mixing belt is carried by a 42-inch belt elevating conveyor system to the coal storage bins above each battery. The discharge from these bins is of the usual type into the charging larries and thence into the ovens.



Detail of coal handling structure

Safeguard Against Service Interruption

Interruption of service of the dock conveyor system in this installation was feared, not only because of possible mechanical difficulties, but also because of the possibility of flooding of the pits. As a safeguard against any such contingency, arrangement has been made for an auxiliary system of coal handling which uses the coke bridge as an emergency part of the coal handling system. This coke bridge, which is located farther from the dock edge than the coal bridges may be directly connected with either one of the coal unloading units. Then the grab bucket handling coal can be run along first the coal bridge and then the coke bridge in a continuous path to the coke-handling belt system that runs along the coke storage pile. This coke conveyor is thus made available, by operating it in the reverse of normal direction, for conveying coal into the plant.

Pocket and conveyor housing

It is interesting to note that arrangements have already been made for enlarging the dock and coal storage capacity of the plant. In order to extend the travel of the bridges along the entire length of coal and coke stock piles, it has been necessary to arrange the various conveyors which cut across the path of travel of the bridges in such a way that the parts which would otherwise prevent the bridge travel may be drawn up on rails, permitting the passage of the bridge whenever required.

Handling Routine

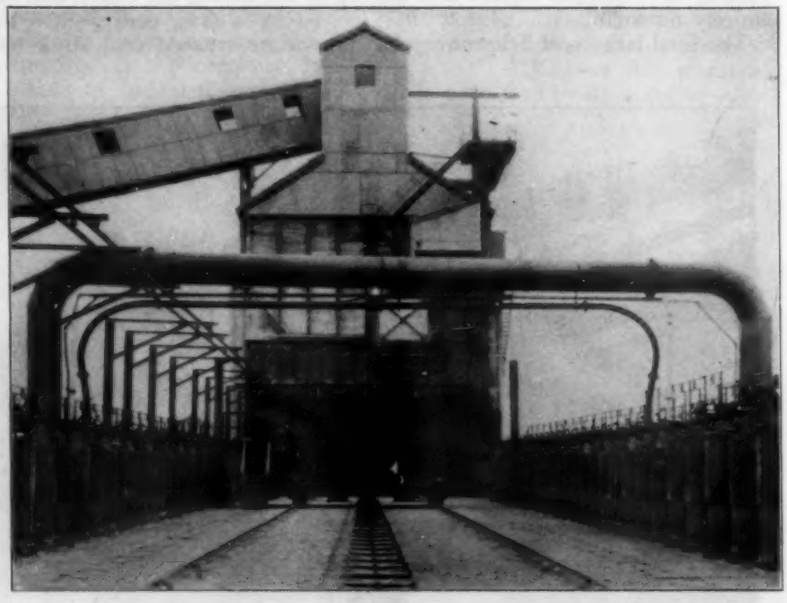
The coke handling system at the ovens is of the conventional Koppers type. In fact all of the coal and coke handling system within the coke plant proper was designed and erected by the Koppers Construction Company. After passage through the quenching car and over the coke wharf, the coke is handled by a 42-inch belt conveyor system to its first screening station which takes place on a 3-inch grizzly. The over-size is transferred to the water-gas coke-storage bin. The small coke which passes through the grizzly is carried by a 42-inch belt conveyor to the domestic-coke screening station.

From the water-gas coke-storage bins a succession of belts carries this coke to the edge of the company dock for loading into barges by which it is transferred to the other works for use in gas making. The barge loading system is so arranged that it is moved up and down along the dock front according to loading requirements by electric capstans. In the handling of the coke through the plant and on the loading apron, which reaches right down into the barge, the design has been arranged so that the coke falls as short a distance as possible in all cases. By this means breakage has been reduced to a minimum.

In screening the domestic size of coke, five products are made; egg, stove, nut, pea, and breeze. The coke breeze is used in this plant for boiler fuel. The nut and pea size are mixed for producer firing to furnish the gas required for heating the ovens. The egg and stove size are loaded as required in trucks or onto boats for shipment out of the plant, or in case of need these domestic sizes are stocked within the plant prior to shipment. In each case the coke discharge from the domestic size bins is over a Mitchell vibrating screen which eliminates the fines. These fines are returned to the top of the domestic screening station by means of a bucket elevator, and thence by rescreening reach the appropriate bins.

Reclaiming Coke

The handling of coke into and out of stock is accomplished by means of a reversible 54-inch belt conveyor which discharges into a 48-inch belt running on the coke bridge. When reclaiming coke, the bucket operated by the man-trolley on this bridge takes coke from the stock pile and drops it onto the 54-inch belt, which by running in the reverse direction carries the coke back to the domestic screening station to be rescreened, or to be loaded on barges or into trucks, as may be required. It is this reversible belt system which affords also the emergency coal handling facilities described above.



Koppers oven tops and Larry car

Oven Gas Pressure Control

By W. M. Shallcross,

President, Shallcross Control Systems Co.

IN the early days of the by-product coking industry little attempt was made to control the pressure on the ovens, probably for two main reasons, the first being a lack of appreciation of the importance of this, and the second because at that time there were no regulators designed for the purpose which would maintain a really constant pressure. It was, of course, appreciated that the ovens should not be run under suction and such efforts as were made to avoid this were made through the engineer of the exhauster engines, who either speeded up or slowed down the engines to give more or less back pressure as the appearance of the oven block demanded. The Engineer's indicator consisted often of two small bleeding pipes (one ¼ inch and the other ⅛ inch) placed on the hydraulic main and visible through the exhauster house window. Correct back pressure was indicated by gas bleeding through the larger pipe but not through the smaller.

An Important Factor

With the development of the industry more and more importance was attached to the CLOSE REGULATION of the pressure in the collector main and consequently in the tops of the oven chamber, until at the present time it is considered ONE OF THE MOST IMPORTANT THINGS IN OVEN OPERATION in order to obtain THE MAXIMUM YIELDS OF BY-PRODUCTS and THE HIGHEST QUALITY OF GAS.

With a theoretically tight oven there is no reason why an oven chamber should not be run under suction, but it is absolutely impossible at present to attain such perfection either in brickwork or the luting of the oven doors as to make this possible. Recognizing these imperfections in brickwork and in oven sealing, a collector main regulator is used to maintain a constant pressure on the main and ovens. This pressure is usually maintained at 2½ to 3 mm. water, but in some plants it is carried considerably higher. The importance of the regulation does not lie so much in the average pressure carried as in the regularity of this pressure and in the elimination of the high and low peaks on the pressure chart. The aim of coke oven operators is to maintain their oven pressure, whatever it may be, at a uniform point, and 1 to 2 mm. water variation between the maximum and minimum is considered very good regulation.

Pressure Effect

It is quite obvious that if the collector main pressure is allowed to build up even momentarily to a high peak the luting around the oven doors will probably be cracked, and when the pressure goes down to normal or into suction, air will be admitted through these cracks into the oven chamber. This, of course, starts local combustion and destroys the by-products and materially reduces the calorific value of the gas.

Just how DESTRUCTIVE this AIR LEAKAGE may be will be appreciated by consideration of the following facts. Tests made both in this country and abroad on several types of ovens showed that rarely do the temperatures in a coking chamber reach a point high enough to cause the destruction of the ammonia that has been formed. At least this does not occur until the last hour or so of the coking period. The maximum temperature in the charge normally would be very little above 1000 degrees C. and this only at the very end of the coking time. However, the admission of air allowing local combustion of gas within the coking chamber would produce a flame temperature of 1600 degrees C. or higher, which naturally would create a very hot spot on the oven walls so that not only the gas consumed with the air is lost, but the intense local heat created by this combustion will tend to break down the gases which come in contact with it.

Some very extensive experimental work done in this country showed an AMMONIA YIELD OF TWO POUNDS per TON HIGHER on ovens operated under a CONSTANT PRESSURE and kept tightly sealed throughout the coking period as compared to the same ovens under slight suction. In addition to the loss of this important by-product, it may be even more serious in the case of a plant producing gas having a high salable value.

Experimental work done by various men has shown that Methane is easily broken down by overheating. This is the most important heat-producing constituent of gas, and a partial breaking down of a small portion of this will result in a very material reduction in the heating value of the gas.

The analysis of an average run of debenzolized gas is as follows:

Carbon dioxide	CO_2	*2.0%*
Illuminates	*Ill*	*3.0*
Oxygen	O_2	*3*
Carbon Monoxide	CO	*6.0*
Methane	CH_4	*32.0*
Hydrogen	H_2	*51.5*
Nitrogen	N_2	*5.2*
		100%

B.T.U. per cu. ft. 564.

If, due to overheating by air leakage as a result of poor main regulation, the analysis of the gas was changed only by 2% less Methane and an equal increase of Hydrogen, the result would be a drop in the calorific value of the gas of approximately 15 B.T.U. per cu. ft. To a plant delivering gas with a fixed and narrow range of B. T. U. this becomes a serious loss and might in some cases mean the necessity for enriching with oil to recover this heat value. This 2% LESS METHANE WOULD NECESSITATE THE USE OF APPROXIMATELY 150 GALLONS OF ENRICHING OIL PER MILLION FEET OF GAS.

A Third Consideration

The above cases illustrate roughly the effects in two respects of AIR LEAKAGE in the oven chamber through POOR MAIN REGULATION. To this should be added the DESTRUCTION OF TAR and LIGHT OIL, and the operating difficulties arising from the production of WALL CARBON in the oven chambers and the production of large quantities of NAPTHALENE which are deposited throughout the entire system resulting in

some very troublesome conditions to the operator.

A widely fluctuating main regulation may result in very poor oven heating, depending on the tightness of the brickwork between the oven chamber and flue system. A high suction on the oven chamber may result in flue gas being pulled into the oven chamber and vice versa in the case of high pressure on the oven.

Bearing all these things in mind, the IMPORTANCE of MAIN REGULATION CANNOT BE OVERESTIMATED, and a collector main regulator that will maintain a uniform back pressure with a maximum variation of 1 mm. water, plus or minus, will be of greatest assistance to the operation producing MAXIMUM YIELDS of all BY-PRODUCTS and will mean the elimination of some very TROUBLESOME OPERATING DIFFICULTIES.

Start of Regulation

The first by-product coke ovens built in this country had no automatic controls but in about 1895 the first collector main regulator was developed. This regulator, crude as it was, produced remarkable results at once.

From that date on, new machines for other control points of the ovens have been developed and the old ones improved until in 1922, the list was made complete by the addition of the full automatic stack draft regulator for large plants.

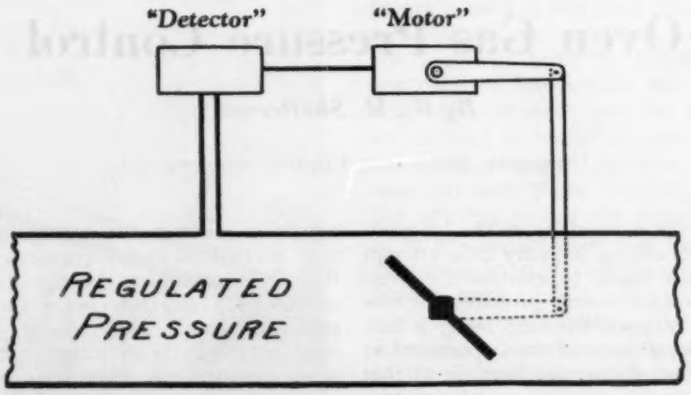
All these regulators, being essentially low pressure governors, are reducible to two elements:—

ELEMENT I—the "detector" which responds to the regulated pressure.

ELEMENT II—the "motor" which corrects the controlled pressure.

In a simple installation the detector is connected to that point in the gas system at which the pressure is to be maintained and the motor is connected to a valve in the gas line. (In some very simple regulators the two elements have been combined—as where a pressure gasometer has been directly connected to a butterfly valve. Such devices merit no consideration in coke plant discussion.)

Many different kinds of elements have been tried and many schemes of combination of the two, with varying degrees of success. The detector has consisted of diaphragms of various materials and shapes, of U tubes containing various liquids, gasometers or bell jars, of floats or pontoons, of metallic bellows, of delicate Bourdon tubes. The motor has usually consisted of a valve of the "butterfly" type operated by a power diaphragm or by a pressure piston moved by steam, compressed air, oil or water, or by an electric motor.



Elements of a simple regulator

A successful low-pressure regulator must have three virtues developed to a high degree. It must be:

1—Sensitive
2—Accurate
3—Simple

Such a regulator will (1) respond to very small changes in pressure (2) quickly move the correcting valve the right amount each time, neither too much nor too little, and must not "Hunt", and (3) it must be so simple that it will rarely get out of order and require but little attention.

Cause of Most Failures

If the causes of failure of regulators in the past be examined it will be found that at least 75% of these failures were due to the lack of the third virtue—they were too intricate. For example, there has been very little improvement during the last twenty years in the charts made by recording gauges on collecting main regulators (the task of regulating the larger plants has of course meanwhile grown difficult) but there has been an enormous gain in the simplicity and reliability of the regulators.

There are several types of oven regulators in use today, all consisting of the same primary elements. motive power used and in the details of construction. The motive powers used are:—

Compressed Air
Oil or Water Under Pressure
Electric Current

Details of construction must vary because of (1) the different motive powers and (2) whether the regulator is of the "compensated" or "simple" type.

Theory of Pressure Governing

In order to understand the use of the terms "compensated" and "simple" as applied to regulators it is necessary for a moment to look into the theory of pressure governing.

When the governed pressure changes from normal the governor starts to act to return the pressure to normal. The amount of this action should be just enough to return the pressure exactly to normal. The stopping of this action at the right time has always been the critical problem in governor design. If the action is stopped too soon the pressure will not be governed within close limits. If the action is stopped too late the governor will overtravel and "hunt".

There are two ways of stopping this action:—

First—the governed pressure itself can be used to stop the action when the pressure has returned to normal. This is a "simple" regulator.

Secondly—a mechanical device, or "follow-up" can be made to "artificially" stop the action after the governor has made a proportionate amount of pressure correction. This is a "compensated" governor.

The simple governor is more direct in its action, with fewer parts, and will govern the pressure more close-
They differ, though, in the type of
ly. Unless it is properly designed

and installed, however, it is liable to hunt. If there is any delay in either the starting or stopping of the governor action it may overtravel and start hunting. In governing pressures where the pressure responds immediately to the motion of a valve and when the parts of the governor respond at once to pressure changes, and when very close and exact pressure regulation is desired the simple type governor is applicable. The pressure regulation of the gas from the ovens of a coke or gas plant is a task for a simple governor—first because of its simplicity and, secondly because of its more exact regulation.

Compensated Governors

The compensated governor is more complicated but is less liable to overtravel and hunt (although sometimes an overly intricate follow-up device itself produces hunting). A compensated governor will not always regulate to the same normal pressure due to the difficulty in making the follow-up device always compensate accurately for each different motion of the governor parts. In those governing problems in which there is a considerable time lag between the motion of the governor and the response of the pressure (as is the case of boiler steam pressure control from the draft) a compensated governor is usually the best type.

In a coke or gas plant the pressure of the gas in the collecting main must be closely governed. This is usually accomplished by a butterfly valve in the suction main near its exit from the collector main. This valve is operated by a motor—either electric, air, or oil—the motor being actuated from a pressure element connected to the collector main.

Collector Main Pressure

The collector main pressure is usually held at 2½ or 3 millimeters, the desired result being atmospheric pressure in the oven chambers. In some plants, due to local conditions, this maintained pressure is set as high as 5 or 6 mm.

The exhauster speed must also be controlled. The original method was to control this speed to maintain a uniform suction in the suction main, usually at the entrance to the primary coolers. This maintained suction had to be such that the collector main regulator had sufficient suction to properly function. As the gas conditions in the plant varied from time to time this exhauster suction had to be re-adjusted, usually at an excess amount for a safe leeway.

A more modern method is to control the exhauster, not from its *suction*, but from the *position* of the collector main regulator valve. This valve functions best when it is about half open and consequently the exhauster control is so arranged as to hold the valve in about this position at all times. The exhauster accordingly re-adjusts itself as plant conditions change from time to time.

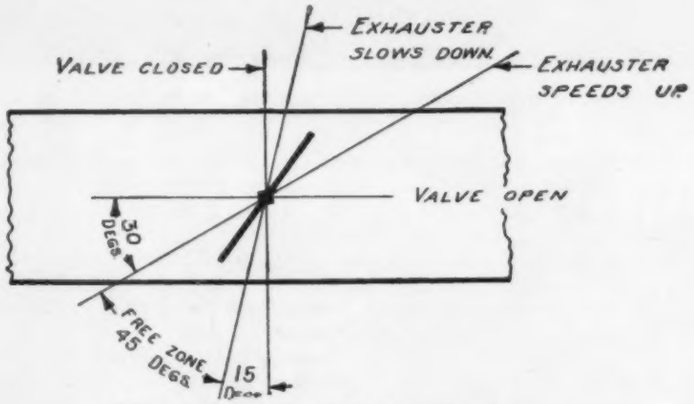
Besides this advantage there are several other benefits from this method of control. The exhauster is always run to give just enough suction at all times at the butterfly valve—no power-wasting excess is maintained. Practically it has been found extremely difficult to prevent interference and hunting between a suction governor on the exhauster and the collector main regulator. Such hunting, besides impairing the oven pressure regulation, raced the exhausters and rapidly wore out the engines, besides wasting power.

In the more modern plants, using the "smokeless" method of charging, where the oven is charged with its standpipes open into the collector main and with steam jets drawing all the smoke into the main, the regulation problem is somewhat more difficult. When such an oven is charged the sudden inrush of steam, air, and gas may be as much as 20% of the total amount of gas then flowing.

Such a sudden increase in gas requires that the collector main regulator must act immediately and accurately in order to prevent pressure peaks on the collector main. The exhauster must also act promptly to draw off this extra gas.

In such a plant the exhauster is controlled by a combination of the two methods described. The exhauster is controlled by a suction governor but the suction setting of this governor is automatically readjusted as the gas conditions vary from time to time. This re-adjustment comes from the position of the collector main regulator valve.

Such a combination system contains all the advantages of the remote control systems without the defects of the original suction control method. At the same time it takes care of the very severe conditions of smokeless charging.



The operating zones of the Butterfly valve

The Mechanization of the Steam Generating Plant

By F. T. Leilich

Research Engineer, Consolidated Gas Electric Light & Power Company of Baltimore.

WITHIN the lifetime of the majority of the engineers of today the art of the generation of steam has undergone a marked change. Twenty years ago the modern plant in nearly all but big industries was hand-fired and man power was used for most of the operations of the plant. Rising costs of material and labor resulted in engineers seeking means of doing mechanically what it had been the practice to do manually and thus reduce the man hours chargeable to the plant, at the same time reducing the effect of the human equation, since well designed and selected machinery has few "unknowns" and will always

Beaumont Scraper Bucket with Tail Block Car in the background for evenly distributing boiler coal

perform the same way. The developments have, of course, been a series of changes as experience would point out the shortcomings of existing apparatus. Today the large steam generating plant is mechanized almost 100% and with it operating results that a decade ago would have been considered practically impossible are being obtained.

The extent to which machinery should be used is determined by the economics of the case. The plant for which the investment and operating costs are a small part of the total costs of the industry obviously would not justify expensive automatic equipment as men are required for its upkeep.

The fuel comes from the mines in railroad cars, although in some plants the transportation charges are such that it is more economical to receive water borne coal. Plants burning many thousands of tons monthly use a car dumper such as is used in the steel industry, the fuel being dumped into a suitable hopper from which it is fed onto a belt, or into distributing cars or otherwise conveyed to the fuel bunkers or the plant storage. Water borne fuel is usually handled by a coaling tower in which a suitable bucket lifts the coal from the deck of the barge or from the hold of the ship and delivers it to a hopper from which it is fed to the bunkers or storage.

Where the fuel is to be crushed and pulverized it is important that the tramp iron be removed. This is most readily done with a magnetic separator, the fuel being discharged from a belt which runs over a special pulley, the action of which is to discharge all non-magnetic material as a stream while the iron and steel clings to the belt until it passes beyond the arc of contact when it drops into a suitable chute or other receptacle.

Methods of burning fuels have undergone a marked change and much attention is being paid to the use of pulverized coal. The advent of pulverized coal has been followed by a marked advance in the development of the stoker. The selection of the type of burning is a problem for each installation. Pulverized fuel has the advantage during banking and pick-up, from the standpoint of fuel required, but stokers do not require the expensive pulverizing machinery necessary for powdered coal, and the explosion hazard is less. The old type of over-feed, natural draft stoker such as the Roney is not much used, and on the larger installations particularly, are being replaced by chain grate or under-feed.

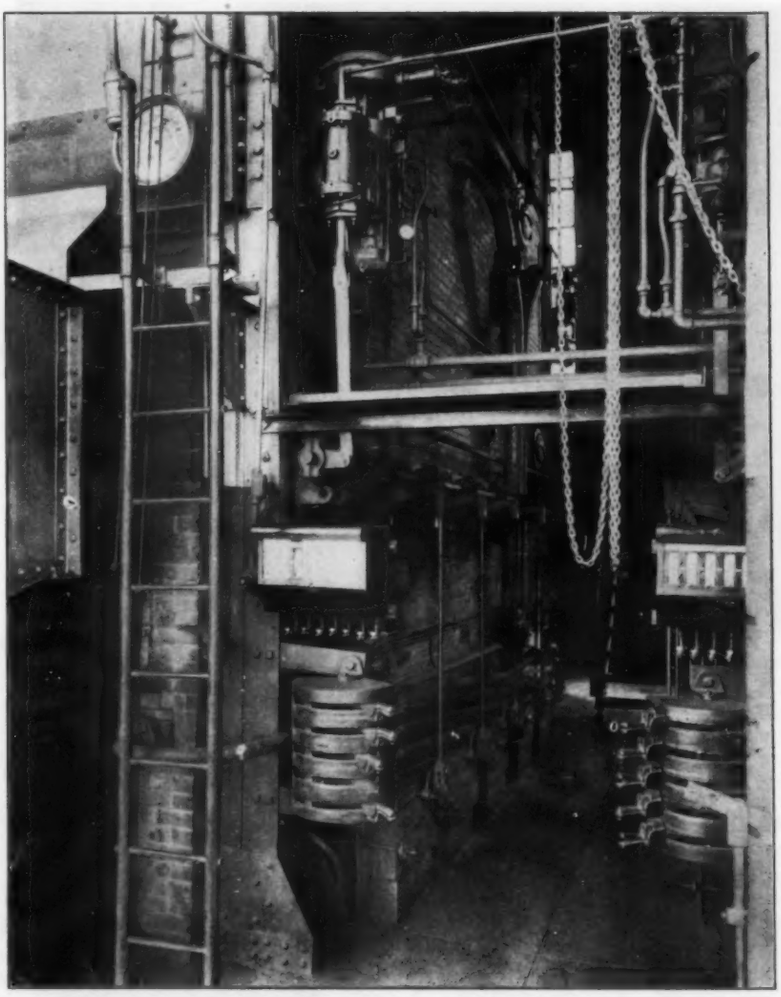
With a stoker installation the general practice is to feed the raw coal from the bunker to the stoker hoppers either by means of a weigh larry or automatic scales, which make it possible to keep an accurate record of the fuel consumed by each boiler. The present tendency is toward the chain grate and under-feed stoker operating under forced draft. In the recent designs the air feed to the different sections of the grate is automatically controlled so that a hole in the fire does not result in starving the remaining portion of the fuel bed.

With chain grate stokers the ash is continuously discharged. With the modern under-feed it goes to an ash hopper, then through a clinker grinder, which discharges either into cars or a sluice. In handling the ash by sluicing, it is discharged into a trough and carried away to a suitable sump pit by high pressure jets of water. This method of handling the ash is adaptable to both pulverized fuel and stokers. The common method of removing the ash from the settling basin is by a bucket. At the present time there is considerable market in some sections of the country for stoker ash, as this is used in the manufacture of cinder block.

Air heaters are now going into most plants as these make it possible to reclaim from the waste gases an

Robins Conveyor with Boom Tripper

appreciable portion of the sensible heat which would otherwise pass into the atmosphere. The present day air heater in its various forms represents a development of the hot blast stove used in the steel industry. Air heaters may be divided into three classes: the intermittent type, plate type, and the tubular type. In the intermittent type sections of the heater are alternately used for the passage of waste gases and combustion air. In the plate and tube type the operation is continuous with the gases on one side and the combustion on the other. The use of preheated air not only results in recovery of an appreciable portion of the sensible heat, but also promotes ignition, the result being equivalent to increasing the heating value of the fuel.



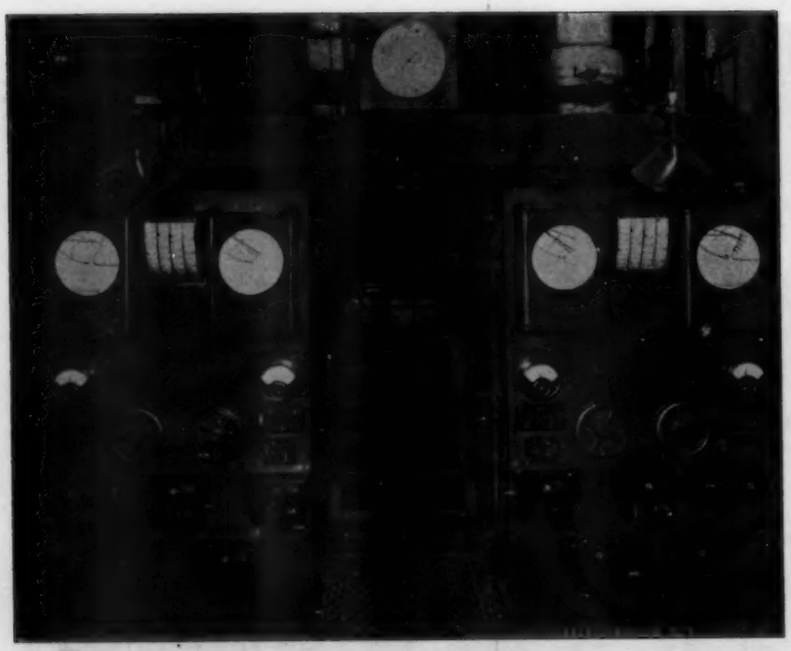
Smoot control; air regulator with complete mechanism for operating dampers in each air zone combustion chamber

Pulverized Fuel Systems

Pulverized fuel systems today although only of recent development, may be divided into the central or storage systems and unit or direct firing systems. With the central system one section of the plant is used for drying and pulverizing of the fuel, and it is transported from there to the bunker over or adjacent to the boilers. With the unit system, the raw coal is pulverized as it is burned, and there is no necessity for keeping in storage any quantity of fuel in the pulverized form, thus reducing the fire risk on the plant and eliminating the necessity for the expensive systems necessary for transporting fuel in central systems. The adoption of either one of these systems should be the subject of careful study of load requirements on the steam generators. Before the wide adoption of pulverized fuel practically the entire surface of all furnaces was refractory lined. In attempting to work equipment at high rates and in burning certain classes of fuel, serious refractory troubles developed. This resulted in the development of the water walls and bottom. Today the large plant is going in with practically the entire furnace lined with useful heat absorbing surface, either in the form of tubes which are connected into the water system of the boiler, or tubes on which are fastened metal blocks. On a number of these installations the metal blocks are refractory faced. The amount of exposed refractory should be determined by the type of fuel to be burned, as the heated refractory promotes ignition, which is quite desirable in the case of anthracite or low volatile coals. With stokers also water cooled backs and side walls are used in installations where it is desired to run the rating up to a high figure.

In order to keep down investment costs, it is essential that the equipment be operated at a high rate. For extreme ratings reliable operation can only be assured by using distilled oxygen free feed water. Evaporators and deaerators therefore form an important part of the modern plant. Where the condensate is not returned or the per cent of boiler makeup is large, it is the general practice to chemically treat the feed water. This has been developed to a point where the necessary chemicals are automatically introduced in the proper amount, and with the aid of testing devices that can be operated by the plant personnel it is possible to keep a check of the feed water conditions.

It has long been recognized that to economically burn the fuel, which comprises the largest percentage of total operating cost, it is essential that the best possible ratio between weight of fuel burned and the air supplied to this fuel be maintained. Various forms of CO_2 recorders have been developed, but the general tendency of the operating man is to get away from those CO_2 recorders employing chemicals or delicate equipment. Previously, furnace conditions depended largely upon the skill of the operator, but today with the CO_2 recorders that are commercially available, he does not have to guess his combustion conditions. The Bailey steam flow air flow recorder is calibrated by an orsat or other gas analyzing means, and then all the



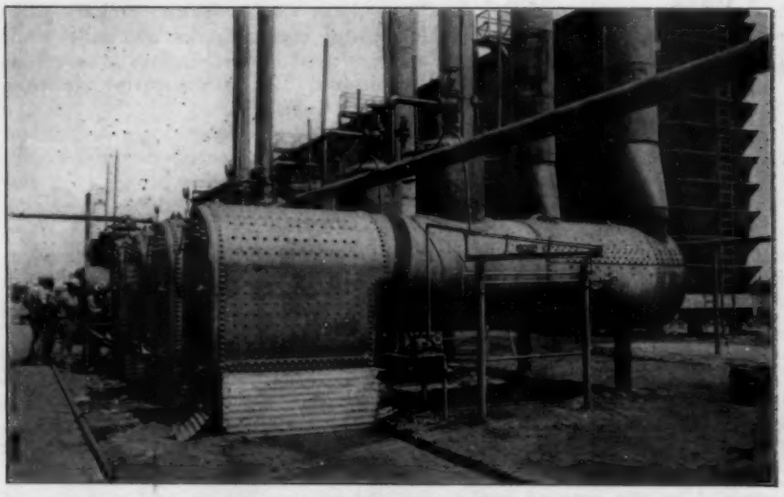
Installation of Bailey Boiler Meters, Bailey Temperature Recorders, and Bailey Multi-Pointer Gages, on 1750 h.p. boilers equipped wth economizers and burning pulverized coal

operator has to do is to keep the steam and air flow pens together. Another form of successful CO_2 recorder depends upon the difference in density of the gas as its composition varies. Its operation is purely mechanical. The electrical CO_2 recorder depends upon the heat conductivity of the gas as a function of its composition. A good CO_2 recorder should operate with a small time lag, and should be rugged, as apparatus of the scientific laboratory type is usually rather short lived in the boiler room. With the aid of CO_2 instruments, flow meter, pressure gauges, temperature gauges and draft gauges, the skillful operator finds the job of maintaining proper furnace conditions very greatly simplified.

Most of the quoted data in the technical press refers to test conditions. These are seldom realized in every day practice. With the modern combustion control, however, it is possible to closely approach test conditions in every day operation. Few of the modern plants of any size are being installed without combustion control, which automatically regulates the air and fuel ratio and maintains the desired steam pressure. While some of the automatic combustion control installations are quite complicated, their installation nevertheless eliminates the human equation to a large extent, and makes boiler operation a more attractive occupation for a higher class personnel than those who are generally found in the old plants where everything was done by hand labor.

As heating surfaces are being worked harder, and the output per dollar invested is being increased, it became necessary to develop an automatic apparatus for the control of feed water to the boilers. One of the well-known types of automatic feed water control is that employing the inclined thermal expansion tube, connected to the boiler drum, in which the water level rises and falls, the tube changes in length as the steam and water percentage changes, and this expansion and contraction controls a valve which opens or closes the supply to the boiler drum. Float operated controls are also used. One of the manufacturers is now developing an automatic form of feed control in which the amount of water admitted is a function of the steam output. With large boilers operating over wide ranges of output it is essential that the feed be reliable and so controlled that at all times the heating surfaces of both the tubes and side walls are liberally supplied with water. With higher pressures further economy is effected with automatic excess pressure regulation which controls the delivery pressure of the pumps to correspond to the drum pressure in the boilers.

In order that the operator may have a true picture of the performance of his equipment, it is essential that he have on record all of the necessary data for a critical analysis of the various phases of plant cost. With weigh larries or automatic coal scales, the amount of fuel burned is readily obtainable. Steam flow meters of both the integrating and of the recording type are available, and form an essential part of the modern plant equipment.



Copes Feed Water Regulator, fired with Natural Gas

Mechanization in the Distribution Department

Power Equipment For Distribution Work

By W. T. Shinholser,
Gas Distribution Engineer, Public Service Co. of Colorado.

IT will not be the intention in this brief article to cover all of the power equipment that might be used to advantage in distribution work, nor to cover in detail all of the uses to which each piece of equipment might be put. To do so, in this age of a daily broadening field for mechanical equipment in all branches of construction, would probably require as many volumes as there are here words. Rather, this will be an attempt to give a brief and general outline of the various pieces of power equipment now in use by the Public Service Company of Colorado.

Trenching Machines

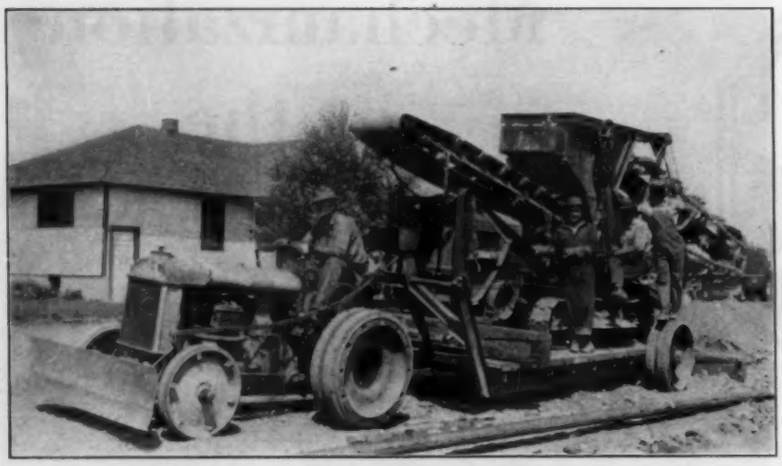
We are now operating three (3) trenching machines; a Barber-Greene, a "Baby" Cleveland, and a "Pioneer" Cleveland, purchased in the order named. The Barber-Greene has now been in service approximately four (4) years and has opened some 30 miles of trench. The repairs and replacements on this machine have been very nominal and we feel that it will dig at least another 20 miles of trench before the maintenance charges become prohibitive. This machine has the vertical boom, making is possible to start a trench right up against a building or obstruction. This feature has also been of great value in opening up over bell and spigot joints for the installation of leak clamps.

In 1925 the volume and character of our work reached the point where we could justify the purchase of an additional trencher, and the "Baby" Cleveland was added to our equipment. To date, this machine has opened some 15 miles of trench and is yet in good condition. The "Baby" is small and light (7,000 lbs.), therefore, making it economical on the smaller jobs. We are also able to place this machine on work for our neighboring subsidiaries, where it would not be possible to justify the transportation of a larger machine, requiring heavy truck and trailer equipment, or else shipment by rail. The wheel type trencher is smoother in operation and somewhat superior in rocky soil, due to the "scooping" action of the digging teeth and buckets. The light weight of the "Baby" also reduces the liability of damage and complaints if working on sidewalks or in parkways.

"Baby" Cleveland in action

During the early part of this year, natural gas for Denver became an assured fact, and it was necessary to construct a 20 inch trunk feeder line within the city. The size of the line and the fact that a great part of it was to be coupled in the trench, practically eliminated the use of either of the above machines, since their limit was a trench 22 inches to 24 inches wide and 5 feet, 6 inches deep. The "Pioneer" Cleveland was selected for this heavier class of work, having a trenching capacity up

Buckeye Crane hoisting dirt buckets from 9 foot trench

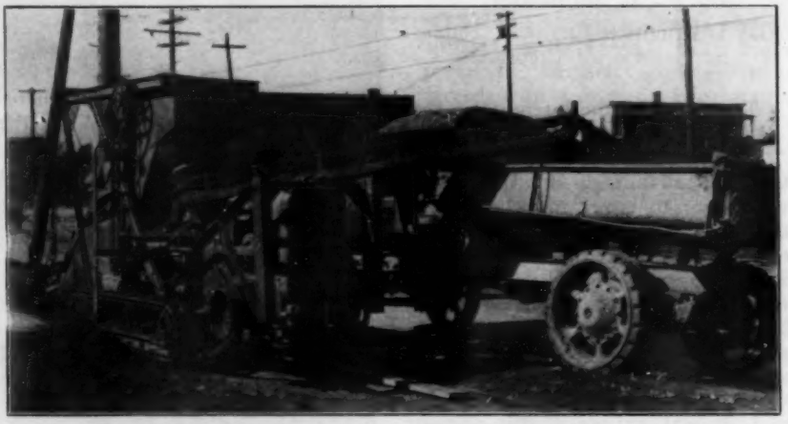


Fordson, equipped with double drum winch, bulldozer, and Trail-It hitch

to 30 inches wide by 10 feet deep. This machine is still light enough (6 tons) to be used economically on a medium size job. The other feature which appeals to us particularly is the high conveyor, making it possible to dump the excavated earth directly into a truck. This eliminates the necessity of rehandling the excess dirt, which effected a saving of $1500 on the recently completed 20 inch main.

The general question as to whether a trenching machine will prove economical is entirely dependent upon local conditions and must be figured by each individual company. The amount and character of main construction, extent of territory to be covered, soil conditions, wage scale and like factors must be taken into consideration. The cost of machine trenching will be about .03 per lineal foot, varying, of course, with local conditions. This includes the operation and maintenance of the machine, but not depreciation or interest on investment while idle. It seems reasonable, and it is generally accepted, that depreciation be figured on a machine life of 40 miles of trench.

For backfilling, two (2) Fordson tractors are used. Both of these machines are equipped with a Baker double drum winch, and one is equipped with a W-K-M bulldozer and a hitch for our five ton Trail-It trailer. We also have a backfill scraper for use on a Buckeye crane. This scraper and the W-K-M bulldozer are used on the larger jobs and for rough filling. The final filling and trimming is done by small mormon boards, handled from the double drum winch on the tractors. It is now quite common to run the trenching machine or loaded trailer over the finished trench to pack the surface.



"Pioneer" Cleveland trenching inside curb, showng high conveyor

Two portable air compressors are now in service, one 5 x 5 truck, mounted, and one 7 x 6 trailer, mounted. The truck mounted unit is used for small, scattered jobs; cutting pavement and concrete walls for service crews, drilling leakage test holes, etc. This unit travels only on paved or surfaced streets, and we find a 1-ton Ford truck to be economical mounting. The larger unit is placed where it will be used over a longer period of time and where it is desired to use a greater number of tools. The tools and fixtures to be operated by an air compressor are almost limitless. At present we are equipped with paving breakers, jackhammer, chipping and caulking hammers, backfill rammers, and sheet piling attachments. These compressors are also used for putting air tests on newly completed

Two feet by four feet opening being made through paved street by paving breakers and Barber-Greene for installation of leak clamps

mains. Equipment of this kind is put to such a variety of work that it is almost impossible to quote any costs, but we believe it conservative to say that the cost of cutting pavement and frost with air tools does not exceed 25 per cent of the cost of the same work when using hand tools and labor.

We have recently placed in service a Buckeye crane, caterpillar mounted. This mounting decreases the mobility of the unit considerably below that obtained with a truck mounted unit, but the cost is likewise decreased. The caterpillar mounting is mobile enough that the unit may be used on a job for both pipe handling and backfilling, and it would very seldom occur that the one unit would be needed to handle work on two major jobs at the same time. The crane will be used for unloading and loading pipe at the storage yard, handling pipe into the trench, and handling dirt by bucket from deep excavations.

Any of the above mentioned equipment is available for use by other departments of the Company. A trencher or air compressor is often used by the Electric Department in the laying of underground cable. On several occasions, an air compressor has been rented to outside contractors to be used in the construction or reconstruction of buildings and structures. This service would appear as a credit on a public relations ledger.

This is a general picture of power equipment in use by this Company, and we feel fits our particular conditions. In the winter months, when all construction is practically at a standstill, we wonder why all the equipment; but in the summer months, we sharpen pencils in an effort to justify the purchase of additional units in order to complete our programs on time.

The Value of Measuring Instruments in Gas Distribution

By C. S. Goldsmith,
Engineer of Distribution Design,
Brooklyn Union Gas Company

MECHANIZATION in the Gas Industry has developed rapidly during the past ten years. The manufacturing end of the industry was probably the first to feel the stimuli to greater and more economical production by the use of mechanical aids, but the distribution end quickly caught the urge. With the tremendous increase in costs of all commodities as a result of the World War this drive toward economy had to take place.

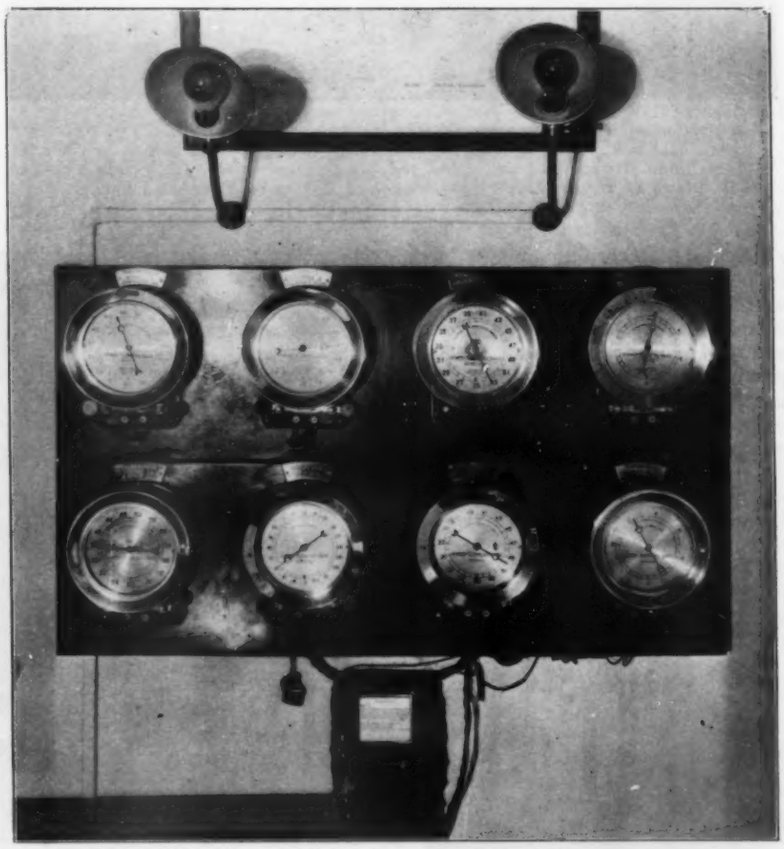
Accuracy to the Fore

As a result of this drive the old rule-of-thumb methods in gas distribution have gradually given place to accurate systems of control based on a thorough knowledge of all essential conditions. To what extent modern measuring instruments have aided in gaining such knowledge this paper will attempt to point out.

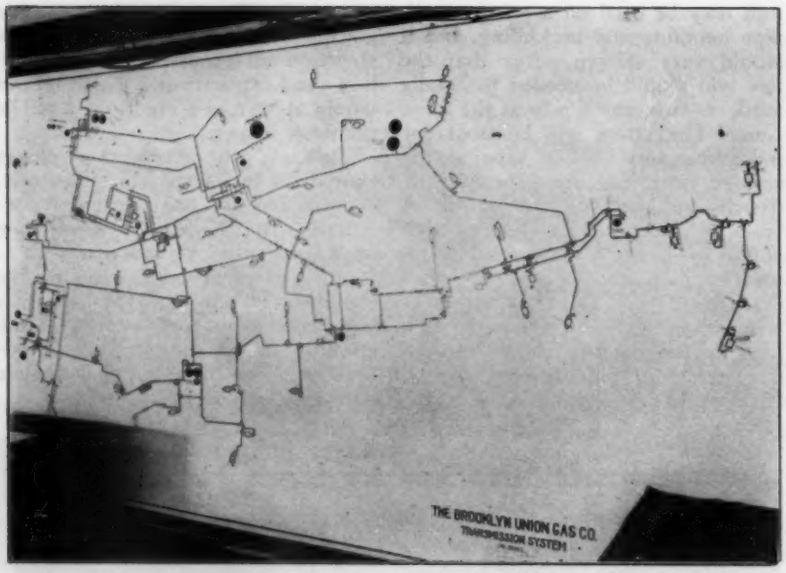
The aim of every distribution engineer is to maintain on the premises of all consumers a continuous supply of gas at a uniform pressure. The various measuring instruments that make this aim possible may be listed as follows:

1. Venturi and Orifice Meters for measuring gas flow in mains.
2. Pressure Recording Gauges.
3. Long Distance Pressure Indicating Instruments.
4. Demand Meters.

Venturi or Orifice meters are sufficiently accurate to warrant their use in ascertaining how much gas is flowing in certain mains during peak hours, or during any definite periods of time. This knowledge may be very valuable as a check against gas lost due to leakage in the mains and services. If consumer account ledgers are maintained according to small units of territory, approximating half a square mile, the monthly gas consumption per unit, or any combination of units, may be had, and this figure compared with the quantity of gas delivered by the main supplying the units in question. Considerable leakage may be discovered in this manner.



These eight gauges form the receiving end of a long distance pressure indicating system. By means of a pair of leased telephone wires, each gauge is electrically connected to its transmitter out in the district.



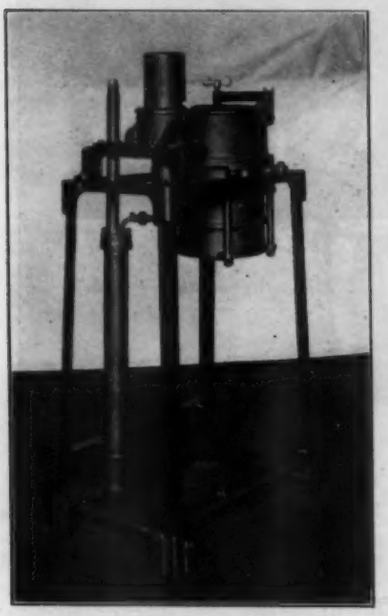
A portion of a map, showing the gas transmission system. Holders are indicated by black circles, district regulators by rectangles, and valves by colored tacks, blue for an open valve and red for a closed valve. Each time a valve is opened or closed the corresponding tack on the map indicates the change

for increased supply may be made long before consumers have cause to call up and complain about low pressure gas.

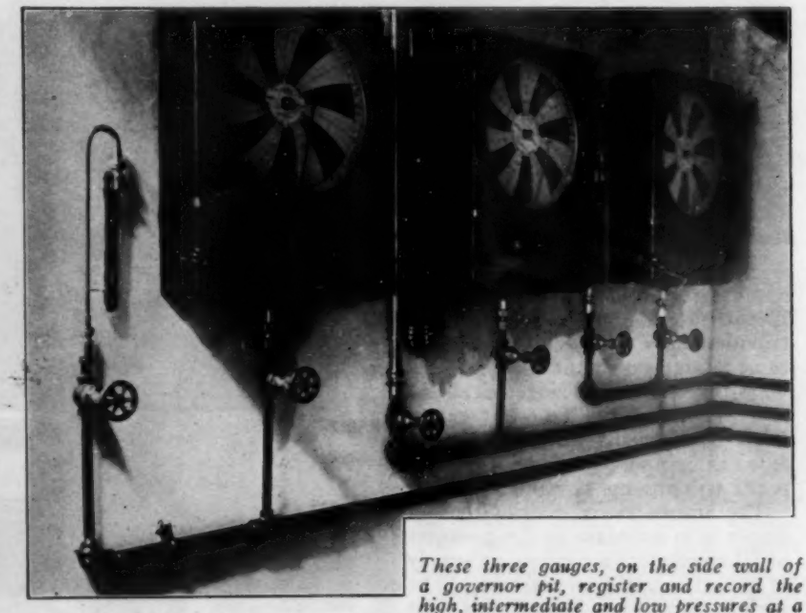
For immediate control, however, long distance pressure recording gauges are necessary. These instruments indicate in the office of the dispatcher the gas pressure in the distribution system at distant points which may be several miles away. If these distant points are strategic locations in the system, the dispatcher is then in a position to know instantly what is taking place and to give the necessary directions to works and pumping stations to meet the fluctuating demands for gas. The transmitters may be placed in governor pits, gas company buildings or, by payment of a small rental fee, in stores.

It is desirable to make frequent checks on the maximum hourly demands of certain classes of consumers in order to determine load factors and diversity factors. For this purpose the demand meter is used. There are various types and makes of this instrument but essentially it is a regular gas meter designed to register and record the consumption of gas for a period of seven days, integrated over half-hourly or hourly intervals of time. It shows, therefore, the peak demand at any half-hourly or hourly period during the week. If installed ahead

Pressure Recording gauges have, of course, been used for many years and are an indispensable part of any distribution system. If the gauges are well placed throughout the supplied territory and the gauge charts are collected daily, an accurate picture of the kind of service rendered may be had each twenty-four hours. To be thoroughly useful, the records contained on these charts should be taken off daily and the minimum, average and maximum pressures tabulated. If uncommonly low or high pressure figures are entered in red, a glance at the sheet will acquaint the man in charge with unusual conditions, and any recommendations

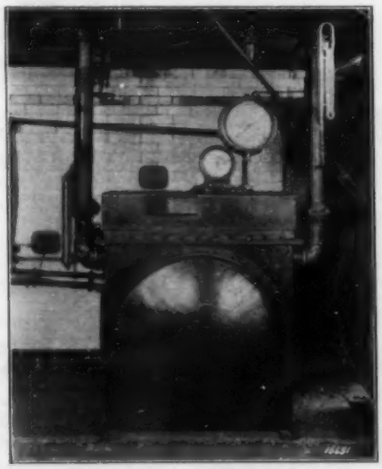


The transmitter of a long distance pressure indicating device. This is placed as near as possible to the point at which the desired pressure is to be taken. Any change in pressure at the transmitter will instantly register on the dial at the other end of the system



These three gauges, on the side wall of a governor pit, register and record the high, intermediate and low pressures at a district regulator. A mercury U-gauge is placed alongside of each gauge as a constant check for accuracy. The charts are changed once a week.

of all the meters in a large apartment house, for example, it will show the combined hourly consumption of all the consumers in the apartment house. This information is of great value to determine the size of service, street main, etc., in future apartment house installations.



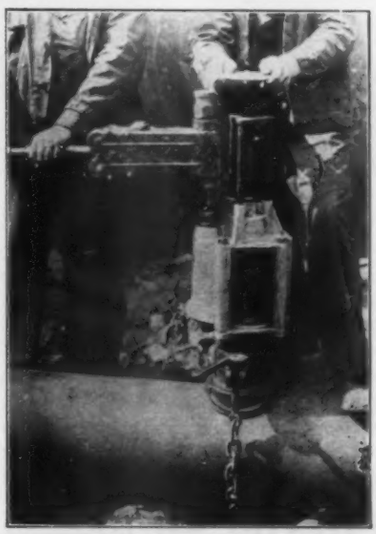
A No. 5 "EMCO" meter equipped with pressure and volume recording gauges installed on a 110 ft. Baker-Perkins traveling oven in Baking company's plant. From the chart of this gauge the average pressure may be determined as well as the hourly demand for gas. The motion of the 10,000 cu. ft. dial is transmitted through a lever arm to the volume recording pen and a wave-like curve is drawn on the chart. One complete cycle of the curve represents 10,000 cu. ft.

Tools For Distribution Work

By G. H. Boyd,
Supt. Subway Division, Consolidated Gas Company of New York

GAS Distribution work consists for the most part in laying new mains and services, altering live mains and laying new services from live mains. In order to perform this work in the best and safest manner, certain tools are used; for instance, gas bags, stoppers, gas masks, pipe tapping machines, pipe cutting and threading machines, pipe pushers, cutting and welding apparatus and other devices.

The gas in the live mains is a highly dangerous substance and needs to be handled with the greatest of care in order to protect the public and the men who have to do the work on the mains. For this purpose it is necessary first to have some means of controlling the gas in the main and of shutting it off when necessary to make an alteration or a repair job. The means of shutting off the gas generally used is either by a rubber bag, which is inserted into the main through a hole that is tapped, and then inflated until the bag fills the main and seals the gas off; or by a stopper, which is folded and inserted through the tapped hole. The stopper is made with an oiled canvas diaphragm on a spring frame on the outside of which is a leather covered cushion of felt. After the stopper is inserted in the main it is opened up by manipulation of the handles until it is tight. As both of these contrivances have to be inserted with gas escaping from the hole into which they are inserted, it is considered advisable for the workmen to wear gas masks of which a number of different designs are in use.



Boyd Patent Power Tapping Machine

In order to get the stopper or bag into a main, a hole must be drilled and tapped under gas pressure. This is done by a machine which is chained onto the main and a tap fed down through a stuffing box, so that no gas escapes during the tapping operation. Tapping a main by hand is a tedious job. A machine for doing this work is operated by compressed air and is now being used by many of the larger companies. The drilling and tapping operation can be accomplished in about one-tenth of the time it takes by hand, with very little unusual labor.

Service work necessitates some device for cutting and threading the pipe. This work is done by the use of pipe cutters and with a stock and die which are part of the service tool cart equipment on each job. In order to save excavation and pavement, in the laying of a service, and where the nature of the soil permits, pipe pushers of which there are several types on the market are sometimes used.

With the growing use of steel pipe in the gas industry, welding and cutting apparatus have become a necessity. In congested city streets in many cases it would be impossible to install or alter the mains without the use of such equipment.

Welding Apparatus

There are numerous makes of welding and cutting apparatus on the market. Herewith is shown one of the standard equipments for welding and cutting now in use. This equipment can be transported from job to job and the work performed there as required. The apparatus shown is an oxygen-acetylene torch. Electric arc machines are used to some extent in this work, but the oxyacetylene method is used more generally.

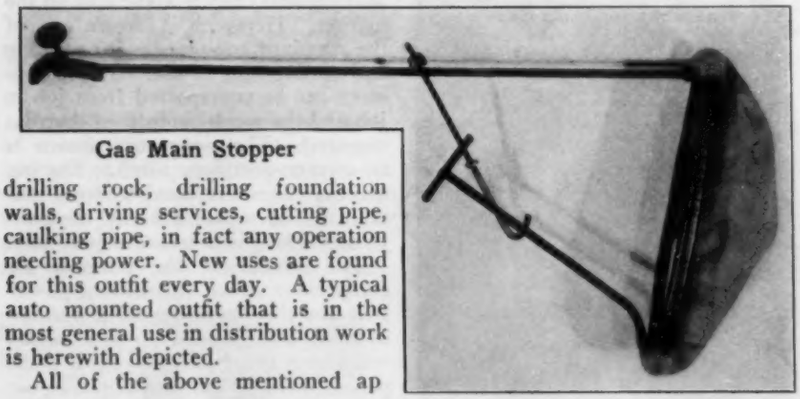
The advent of the portable air compressor which furnishes a power unit for the operation of a number of tools, has speeded up distribution work to a great extent. Most companies have found the portable air compressor unit a real necessity for street work and some of the larger companies employ a great many of them. A very useful outfit is that

Oxy-Acetylene Equipment for Distribution Work

The Portable Air Compressor

which is mounted on an auto truck which carries in addition to a crew of men, a full complement of tools. These outfits are capable of tapping the mains with any size hole desired, up to 6", of breaking the pavement, drilling rock, drilling foundation walls, driving services, cutting pipe, caulking pipe, in fact any operation needing power. New uses are found for this outfit every day. A typical auto mounted outfit that is in the most general use in distribution work is herewith depicted.

All of the above mentioned apparatus with the exception of the gas bag and stopper have found their way into gas distribution work during the last 10 or 15 years, together with many other of more or less importance.



Gas Main Stopper

Mechanization in the Shops

By C. E. Woolen

Asst. to Genl. Supt., Cons. Gas Electric Light & Power Co. of Balto.

IN the Gas Distribution Departments of many of the larger gas companies it has been found advantageous and profitable to maintain a shop for the purpose of carrying on such work as gas range and other gas appliances repairing and rebuilding, cutting and threading of pipe, both large and small diameters, and the cutting and threading of pipe nipples. In addition to this, wood working of various kinds, oxy-acetylene cutting and welding, making up of small standard connections for gas meters and water heaters are performed, as well as many other operations of a varied nature.

The growth of the gas industry as a whole demands individual expansion of its separate units or departments in order to keep step with the increase in the mechanical work resulting.

In order to meet this growing demand and carry on the shop work, it is quite essential that the man in charge keep posted as to the mechanical equipment available for performing the work. Frequently a casual reading of advertising matter in magazines or catalogues will disclose the fact that there is a machine to be had which will not only partly supplant man-power, but will also lighten the burden on the operator, reduce costs, and still turn out work which will meet all specifications as to quality and quantity.

There are many examples of machines of this character, such as automatic threading and cutting of pipe nipples. Every man who cuts and threads pipe knows the effort and time he must put forth to cut and thread a piece of pipe by hand. Now a machine does this work in a fraction of the time and effort and turns out perfect work. Saws may be sharpened quicker and better with a machine sharpener, while combination wood beaders and routers perform this work with no more effort than is occasioned by a slight move ment of the hand.

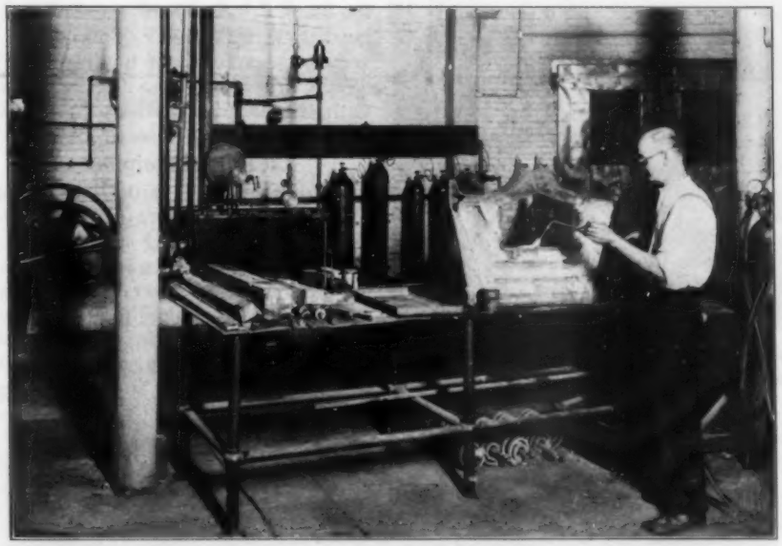
Accident Prevention

Hand in hand with the mechanization of shops comes a danger of accidents to the operator, from the high speed of the tools used. As a safeguard against this hazard all machines should be properly equipped with guards over the cutting edges, sturdy frames over chain drives and flexible couplings, and housings over grinding wheels and high speed saws. Wood working machines of all kinds cause a large accumulation of shavings which cause a distinct fire hazard, and sawdust which floats in the air makes a fine dust which is unpleasant for workmen operating the machine. Nowadays this can all be completely eliminated by having wood working shops equipped with shavings exhaust systems which suck all of this refuse away from the cutting edges of the machines and remove it to containers far away from the shop. Chipping, grinding, and polishing of metal is dangerous to the eyes of the worker and welding and cutting occasion a strain on his eyes which is both unpleasant and dangerous. Ample protection for eyes is provided by using clear glass goggles for grinding and chipping, and colored glass for the welding and cutting work.

Further economies may be effected with mechanization by having the equipment so arranged that each branch of the work has all its relative machines together, and by having these machines arranged to the end that work will proceed through the shops with the least possible travel.

Individual motor drives are highly desirable, as this not only gives greater power from the machine, but also saves electrical energy in that it is not necessary to keep a large

motor running for one machine as is the case when such a unit is used to drive all machines through shafting, pulleys and belts. It also eliminates the mass of shafting, pulleys, and belts which are constantly in need of repair or adjustment.



Oxy-acetylene welding and cutting in repair and maintenance work as well as construction plays a large part in gas company activities.

The Gas Distribution Department of the Consolidated Gas Electric Light and Power Company of Baltimore, Maryland, maintains an Appliance Repair and Mechanical Shop on the sixth floor of its general warehouse at Front Street Station. This shop, being situated on the top floor of a large building, is well supplied with light on all four sides from large windows which also give splendid ventilation at all times. This shop performs such work as the making of stands and pedestals for window display work, meter shelves for gas meters, planing and carpenter work for the various company departments, special wood work for Main and Service Department jobs, sheet metal flues for furnaces, hot water heaters and other appliances for commercial, industrial and domestic work of the Gas Installation Department, and other miscellaneous tin and sheet metal work for building maintenance, cleaning and rebuilding of ranges, water heaters, and gas fired boilers, cutting and threading of nipples of all sizes of both small and large pipe, forging and repair of nearly all tools used by the various operating departments of the Company, testing of condensation meters for district steam heating, and many miscellaneous jobs too numerous to mention that are required by the Company in its many operations and activities.

There is also a branch of this Shop located on the ground floor of the main building at Front Street where welding of large furnace piping is done, in the fabricating of large pipe bends, special pipe shapes, repairs to gas main fittings, such as valves, drip pots, and sleeves. Here cast iron, brass, and other metals are welded or brazed, hot water boiler spuds are put in, water heater coils are repaired by brazing, and all kinds of metal cutting is done with oxy-acetylene flames. This shop is equipped with a large three stage air compressor which fills tanks with air for use in the clearing of stoppages in house pipes, and services, and supplies the Front Street building with compressed air for the Laboratory and Gas Meter Repair Shop.

Each separate unit of the department is equipped with modern machinery which is driven by individual motors either direct drive or by silent chains which are carefully screened for safety. The high speed wood working machines are equipped with guards over the cutting edges, and a large exhaust fan and suitable ducts remove all shavings and sawdust from the machines, thereby eliminating dust, fire hazard, and considerable labor which would otherwise be required for cleaning out this refuse.

Modern Grinders and Buffers

Modern grinders and buffers perform the work of repairing, rebuilding, and refinishing gas appliances, and the repair and maintenance of tools such as axes, cant hooks, brush hooks, chisels, hammers, wrenches, shovels, picks, and many other small tools used by the various departments.

Paralleling the mechanization of the work which the men perform, this shop is equipped with a large comfortable wash room where showers with hot and cold water are ready at all times, a modern circular lavatory where a dozen men can

The gas appliance repair shop. Here power driven grinders and buffers save labor in trimming and polishing.

These large tanks wash all dirt and grease from used appliances quickly and completely.

wash up comfortably with a touch of a foot pedal. A locker room is located next to the wash room where the workmen's street clothes are kept clean during the day, and a table supplied with the latest magazines and ample chairs are provided to enable the men to sit during lunch time and read.

Modern Elevators

All of the material which comes to the shops is carried on large high speed combination freight and passenger elevators, which can accommodate twelve-foot boards as well as twenty-foot lengths of pipe. As the warehouse for housing the material and supplies of the Company occupies the five floors below the shop, all of the material made in the shop, such as pipe nipples, lead meter connections, meter shelves, cable reels, tools, tool boxes, tin shapes, rebuilt gas ranges, and water heaters, is removed from the shop through a center aisle, which is always kept open, to the elevator and thence to the floor below where each particular article is stored. This saves a very large amount of hauling which would otherwise have to be done with the shop located at some distance from the storerooms.

Cleaning Equipment

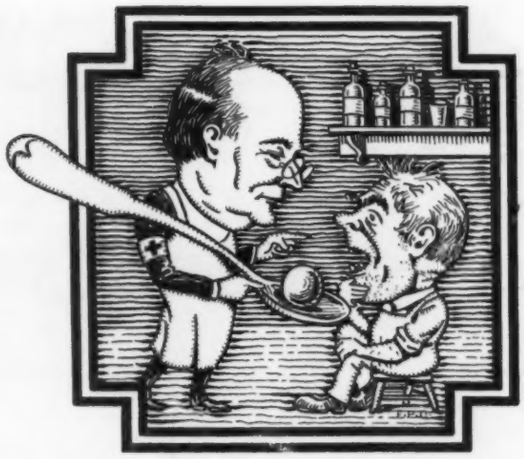
Two large steel tanks located on a water-tight concrete platform are provided for cleaning the appliance parts, and chain hoists are suspended on steel I-beams over these tanks, which allow the handling of heavy ranges with very little effort on the part of the workman. A gas fired boiler supplies steam for heating the water and caustic soda is used to cut the grease and dirt from the appliance parts. An ample space heater provides comfortable moderate temperature during cold weather and when night work is necessary large 100-watt electric lamps give ample light over all machines and benches.

General view of Pipe shop with tool repair shop in background. Note ample room and cleanliness. Good lighting and high ceilings make for employee's comfort.

The Carpenter Shop. Suction systems for removing shavings and sawdust cut insurance costs and make for cleaner atmosphere and less cleaning labor.

All in all, if shops are to be maintained they are worth mechanizing to the fullest extent, and this policy has been carried out in our shop, for it is a recognized fact that when you save the employee's back you not only reduce costs and give better service, but you maintain a high morale among the workmen, and without this latter nothing really worth while can be accomplished in shop practice.

Mechanization in the Protection of Life and Property



By Floyd Mason

Supt. of Publications, Rochester Gas and Electric Corporation

AS the gas industry, through mechanization, has cut corners, has become more efficient and therefore of greater service to the public, it also has kept pace in the matter of safeguarding life and property. Keeping down preventable accidents, rendering aid in cases of gas poisoning, protecting property from conflagration, and giving instruction in safe practices are some of the things done by one specific gas company.

For many years, the Rochester Gas and Electric Corporation has attempted to educate its employees and the public as well in the principles of safety. Talks, before schools, clubs and other organizations, illustrated lectures, prone pressure demonstrations and safety films have consistently been utilized in getting the safety idea "across."

Its inhalator service, available without charge, night or day is one of the Company's outstanding emergency safety services to the public.

Safety chisel bar holder. Workmen are not permitted to hold the chisel bar without the safety bar holder.

Apparently every Rochesterian knows about this service, and hardly an emergency arises but that either the Police or Fire Departments of Rochester, or some of its citizens call in asking that the inhalator be rushed to the scene of trouble.

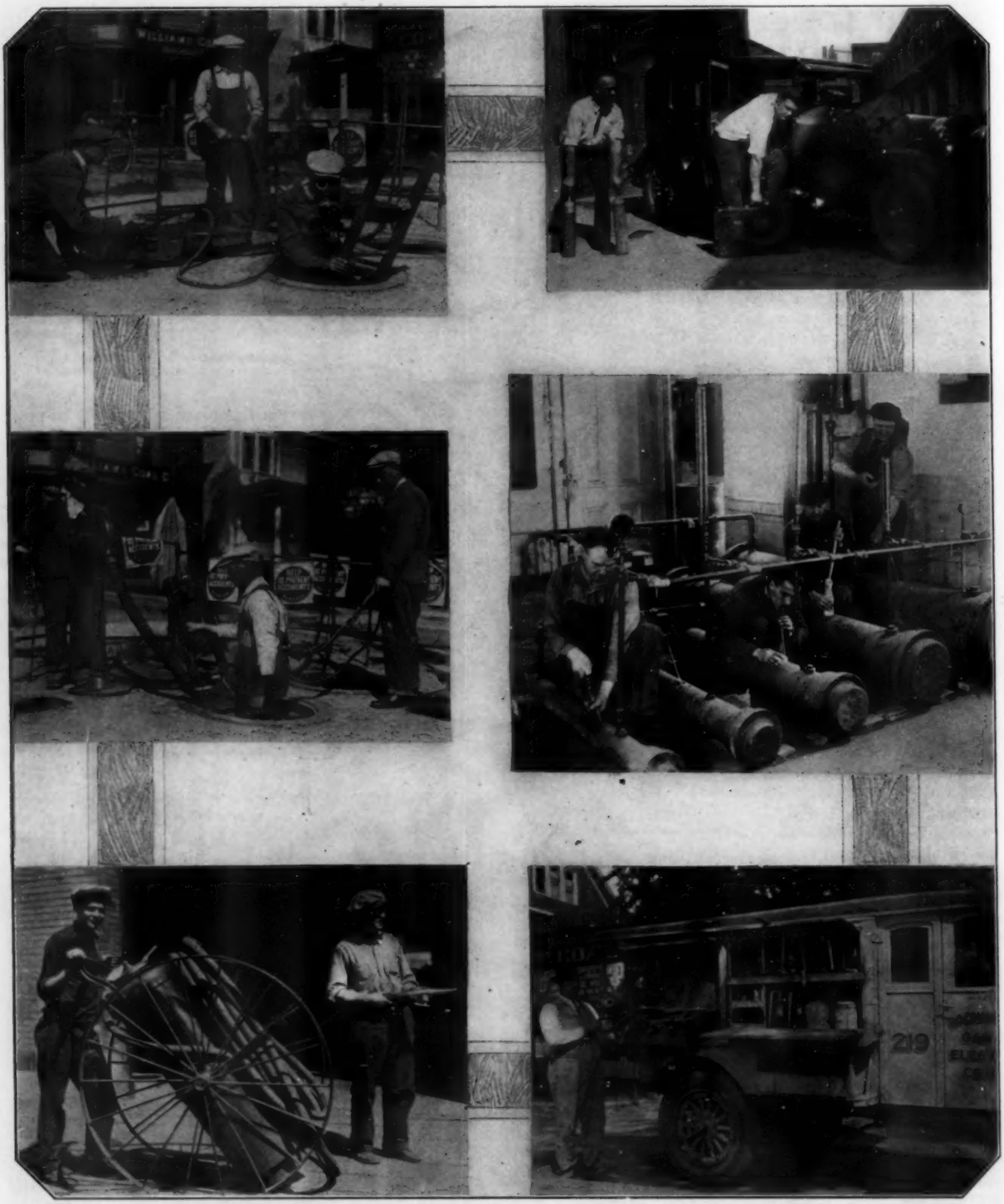
First aid cabinets are located in all offices, shops and plants and are regularly inspected and maintained.

Last year, seventy such calls, most of them outside the Company, were answered and valuable aid rendered, 31 of the cases being caused from gas poisoning. The inhalator was used in 26 of them and 22 of the victims were restored to consciousness. The Company's Inhalator men spent 79 hours last year in this worthy work, and used a total of 36 tanks of oxygen in effecting recoveries.

Every minute counts in such emergencies. Therefore, the Company's Inhalator, experienced men to operate it and an automobile to rush them on their mission are always available, night or day. No time is lost. The call comes in at the telephone switchboard. An operator presses a button which rings three gongs summoning the driver and the car from the Garage, the Inhalator operator from another department, and a man who speeds the needed equipment from its regular place to the waiting car. A pleasing synchronism characterizes these combined human efforts and in almost no time the Inhalator is on its way; the siren is warning off traffic and the right-of-way is open for these emissaries of safety.

The Rochester Gas and Electric Corporation employs numerous other, less spectacular means to safeguard life and property. Let us consider some of them.

A utility is always responsible to the public for the service it is enfranchised to render. This responsibility includes an implied obligation to keep properties in excellent operating condition, free from hazards and protected from fire risks. An example of this necessity to be prepared in emergencies is comprised in the Company's Firefoam equipment, located at points where oil or gasoline fires might occur. At its East Station light Oil Plant, the Rochester Gas and Electric Corporation has a 20,000-gallon Firefoam unit capable of pouring 140,000 gallons of foam upon conflagrations at this station. Its large Garage is also equipped with a smaller Firefoam plant and there are numerous other portable fire-fighting units and sprinkler systems throughout all Company properties which may easily be utilized whenever necessity requires.



Upper left—Workman descending into gas regulator vault to make repairs. He is protected by a gas mask and a safety belt to which ropes are attached. Man at left is operating blower supplying fresh air into the mask. Upper right—The Company's inhalator all set to answer an emergency call. The Inhalator crew answered 70 emergency calls last year and helped to restore to consciousness 22 victims. Center left—Blower type forge with flexible hose connection being used to force fresh air into regulator vault while workman makes repairs. Safety belt, with ropes attached make it possible for workmen on guard to haul the repairman back to safety. Center right—Scene in Shop School; operated by the Gas Street Department. Men are being taught methods for using stoppers, bags, on gas mains of various types. Lower left—One of the many portable Firefoam units located at Company properties where there is a possibility of gasoline or oil conflagrations. Lower right—One of the emergency gas trucks which are available night and day

Protecting its men from harm is another obligation of gas companies. Service is impaired through the inability of employees to perform their normal duties. In thus safeguarding human life and limb, the Rochester Gas and Electric Corporation utilizes the most modern equipment obtainable. In repairing gas regulators, gas leaks in cellars, tunnels or gas mains and in other connections, men are required to use gas masks and safety belts. While such work is in progress, fresh air is pumped into the working zone by a blower type forge. If a workman should be overcome, associates on the ground above are enabled to haul him out to safety by means of the life belt and the ropes attached thereto.

Fully Equipped

Each one of the Company's numerous Gas Department trucks is equipped with a full assortment of safety equipment, as well as tools for all kinds of distribution repair work. Foremen on these trucks, wherever they may be working, night or day, call up the gas dispatcher at regular intervals so that emergency crews are always available. Years ago, when only horse drawn vehicles were in use, service of this character and efficiency were impossible. The modern "mechanical horse" has done much to maintain satisfactory service and save life and property in emergencies.

Safety expansion service stoppers of various types, and rubber bags comprise needed accessories in gas main extension and repair work. The Company has developed an expansion stopper with a safety clamp to fasten it securely to the gas main. This is now used instead of the usual wooden plug for tempororily stopping ends of gas mains.

Goggles Compulsory

Workmen are required to wear goggles in any work where impairment of eyesight is a possibility. Instances of their common usage are those in connection with loosening up concrete with picks preparatory to construction work and when pavement breaking or other labor-saving machines are being operated. Modern mechanical devices save much time and money. They "make the dust fly" and industry has learned the necessity for protecting the eyes of all those who use them.

In 1925, the Company inaugurated a Shop School. In it both the foremen and workmen in the Gas Department are regularly instructed in their work. This instruction includes training in the use of modern equipment, tools and mechanical devices as well as practice in the prone pressure method of resuscitation, which is taught to all Company employees as soon as they enter the organization.

More than fifty subjects are now taught, not only to Company employees, but also to the employees and foremen of contractors doing work for the Company. This school has greatly increased the efficiency of work done and has made every man a potential life saver through proficiency in first aid work.

First aid cabinets are installed throughout all Company offices and departments, and every outside crew is equipped with first aid kits. With all of its employees well versed in safety work, much time and money has been saved and routine activities progress with unusually few interruptions. This, again, has a constructively beneficial effect upon morale and assists in keeping the wheels of this large organization efficiently turning, and its service consistently satisfactory.

Higher Type Workmen

When mechanization invaded industry, it inaugurated more-efficient methods of accomplishing work. One of the things it did was to eliminate man power to a large degree. Only those human factors survived which are indispensable under the present regime. Obviously, these survivors are men of more than common calibre. They represent a higher type of worker and are essentially supervisors of machinery and equipment rather than mere laborers. Protecting them from avoidable accidents, that they can maintain a high degree of efficiency in their work is one of the purposes of gas companies in furnishing them with adequate modern emergency equipment.

Besides conserving man power, protecting property and helping to maintain excellent service, mechanization has enabled gas companies to continue to sell their product at rates that are no higher today than they were many years ago. And hand in hand with it, in this age of machinery, is the enthusiastic effort of such companies to train not only their own employees, but large numbers of the general public in safe practices.

Space does not permit the detailed elaboration of the subject discussed in this article. It is possible, however, that the accompanying illustrations will serve to enable one to read between the lines and more completely visualize what modern gas companies are doing in this connection.

ENGINEERS SEEK ACCURATE GAGES AS PROTECTION TO LIFE AND PROPERTY

Because the safety of human life often depends upon the accuracy of the pressure gage on a steam boiler or other pressure equipment which can explode, the American Engineering Standards Committee has been asked by the American Society of Mechanical Engineers to approve the establishment of national standards for pressure gages. The standards might provide, for example, for such construction that the gage could not indicate a zero pressure when there is actually sufficient pressure to constitute a grave hazard if a workman should open a boiler or tank.

Grant of the request by the Standards Committee will be followed by the formation of a committee of technical experts to undertake the work of gage standardization. Besides decreasing the accident hazard, it is expected that the work will benefit manufacturers and purchasers of gages by replacing the great number of sizes and types now being manufactured by a comparatively small number of standard sizes and types based upon the findings of the committee of technical experts.

The United States Navy Department has done much important work in establishing gage standards for the use of the Navy, and several private concerns, such as the Firestone Tire and Rubber Company, the General Electric Company, and the Pennsylvania Railroad Company have established specifications for their own use.

The standardization of pressure and vacuum gages may include, in addition to specifications for accuracy and temperature of calibration, such items as ratings of capacity; arrangement of graduations, numerals, indicator hand, and certain features of the interior mechanism; and the position of stop pins.

Mechanization and Transportation Are Synonymous

By H. W. Drake
Supt. of Garage, Portland, Ore., Gas & Coke Company

WITH the constant growth of cities and industrial plants, the transportation problems of public utilities have increased far beyond the expectations of those who handled transportation ten or fifteen years ago. The industry has grown to such an extent it would be practically impossible to operate economically without the use of modern transportation. The territory which the various companies now serve is not measured by city boundaries only but in many cases covers counties and states. Material, as well as persons, therefore, must be transported over these large areas in the shortest possible time and at the lowest possible cost. This is the problem of the automotive transportation man regardless of the field in which he may be working.

When comparing the activities of the many organizations of this kind we find that the small organizations have their problems which are just as important to the efficient operation of their company as are the problems of the larger companies.

Generally there are several different types of transportation vehicles, namely: transportation for officials and supervisors; for collectors, high bill inspectors, salesmen, etc.; for service men, measure men, and fitters; for service installation crews; for the delivery of briquets or other by-products as well as general hauling. Each one of these groups represents a different problem and each one must be given individual attention if satisfactory results are to be attained.

Automotive transportation for the officials and supervisors consists of business cars of various makes and types. There is little to be said about the business or touring car for in most commercial fleets there is an assortment of many different kinds.

The automotive equipment for salesmen, foremen, collectors, inspectors, etc., has been confined in most cases almost entirely to a light roadster. A considerable number of these roadsters have been operated ranging in age from 60 to 70 months and the oldest one 74 months old. The photograph shows a few of these vehicles and will give an idea of the way they are maintained, the general appearance, etc. During the last twelve months these vehicles were operated at an average cost of $0.059 per mile. Peculiar as it may seem, the two oldest ones, during the past months have cost an average of .040 and .038 per mile. It is be-

Motorcycle Fleet. Motorcycles used by service men and fitters.

5 ton White briquet truck and trailer.

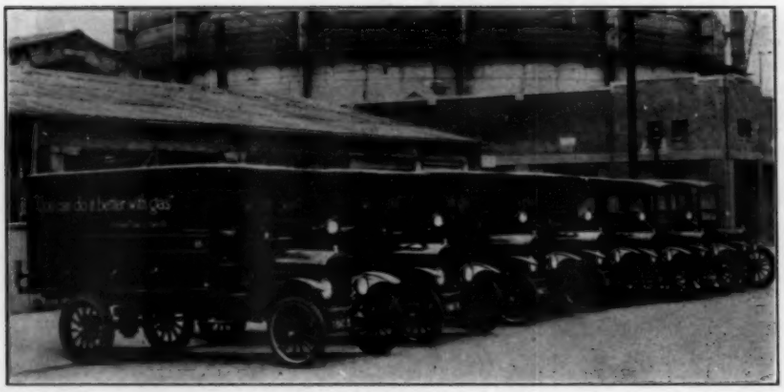
lieved that these vehicles can be operated without an increase in cost of operation for a number of years to come. These vehicles are operated on an average of eight thousand miles each per year.

The investment on this type of vehicle is as low as one could expect to obtain, and the operating cost is also very reasonable. In this way reasonably fast transportation for those who, by nature of their work, are required to cover considerable ground during the working day can be provided at a nominal unit cost. There is no comparison between the time it takes to get about the city and over territory in these vehicles and the time it takes on street cars; and in 99 cases out of a 100 a more expensive car would not provide any speedier transportation.

One company operates, for the use of service men, measure men, fitters, some meter readers in the outlying district, lock and turn-on men, etc., some 39 motorcycles with side cars. These motorcycles are provided with a side car box or van. The boxes are so arranged that a man may carry fittings, tools, meters, and other miscellaneous materials that may be necessary for him to take into the field. During the past twelve months these vehicles were operated a total of 301,745 miles. The cost of operation ranged from $0.017 to .090 during this time. The cost of operating these vehicles reflects more clearly the age of the vehicles and the topography over which they are operated. Some of these vehicles are out in the country where roads are very rough, much mud in the winter time and dust in the summer time. It costs more to operate motorcycles under these conditions than it does to operate them in the city. These conditions will affect the cost of operation of any vehicle but we think it more pronounced in this type than in the larger types. The accompanying picture shows this type of equipment.

Service installation crews, by nature of their work, must have with them a considerable number of heavy tools, and transportation has been provided for them. One ton trucks are used as the transportation medium. These trucks are equipped with boxes providing places for tools and fittings which workmen find necessary to carry with them. It can be seen by the photograph, which shows a group of these vehicles, what type of body is used. Because of the nature of the work in which the vehicles are employed it has not been deemed practical to use expensive equipment for the vehicles are virtually traveling tool boxes. In a majority of cases these trucks do not average more than 20 miles per day. The cost of operating vehicles under these conditions has been relatively low. After having operated ten of them better than 50 months we find a $0.098 per mile average cost of operation. Considering the age and the use to which the trucks are put

5 ton White tank trucks, 1500 gallon capacity. Pneumatic tire equipment replaced solid tires thereby effecting a material reduction in pay load.



1 Ton Ford deliveries. Service trucks used for main and service extensions, light deliveries, etc.

and the small number of miles which they travel, etc., this cost is very reasonable. At the same time, very efficient transportation is provided for the service crews and the material which they use. With this type of equipment service crews can be dispatched over a very large area in a short time, making this installation organization very flexible. This is desirable because it is found that the work is more scattered as cities grow, the old sections being practically complete and the new sections, where residences are more scattered, becoming the scene of operations. These trucks are equipped with cushion tires and therefore have no tire trouble or delays from this source in the field. They are also equipped with governors which control the speed. These vehicles have been operated from 30 to 40 thousand miles and the present mechanical condition indicates that they can expect an additional 30 or 40 thousand miles without an increase in the cost of operation.

One company has for many years manufactured carbon briquets as a by-product. This fuel is practically all sold locally and the transportation problem is to deliver 55 to 60 thousand tons yearly. For this work they are using nine five-ton trucks with five-ton trailers. It is neccesary during three summer months to deliver approximately eight thousand tons per month and to do this the routing and dispatching as well as the mechanical condition of the trucks must be near the mark of perfection. In handling the briquets, which are delivered practically entirely within the city limits, they have a seven mile dead haul. This in itself requires considerable time and has been a subject for much study. The trailers used in connection with the trucks assisted materially in overcoming this problem and now the question of speed is being considered. During the past 12 months the trucks were operated 111,000 miles. They consumed 35,000 gallons of motor fuel and 1,000 gallons of lubricating oil. To keep these vehicles in mechanical condition, washed, and lubricated $5,600.00 was spent for labor and $3,900.00 for supplies. With tires, license, and insurance and overhead expense the total cost for the past twelve months was $24,300.00 resulting in a cost per mile of $0.219. The cost per ton has been approximately $1.92 during the past 12 months. If one were to try to visualize doing this work by the old methods of transportation, namely; horse and wagon, it would take so many units and so much labor that the cost of delivery would be so great they probably could not compete with other fuels available.

5 ton White Truck and semi-trailer. 2500 gallon capacity tank. Maximum speed 26 miles per hour. Gross weight 34,300 lbs.

Another by-product this company manufacturers and which is distributed throughout the city is Gasco Motor Fuel; a gasoline-benzol blend. At the present time three trucks are employed in this work. Two photographs show these trucks, two of which are five ton trucks, one 37 and the other 60 months old. The new one is a semi-trailer job of the latest model, 5 ton. The two original trucks were equipped with 1500 gallon tanks and cushion tires, but, owing to a very limiting state law, it was necessary to make changes which would reduce the weight of the vehicles in order to permit carrying a pay load of any consequence. The state law limits the load per axle to 14,400 pounds. The total weight of any one vehicle on two axles 20,000 pounds. With the two older

Fleet of Ford Roadsters, for salesmen, collectors, inspectors, etc.

trucks weighing better than 12,000 pounds each the load was limited, consequently pneumatic tires were installed which reduced the weight considerably. All can racks, barrel racks, and other equipment which was not absolutely essential was removed. This reduction of weight was carried so far as removing the rear cross section from the frame of the truck. By making these changes a reduction of weight of practically two tons was effected. In changing from cushion tire equipment to pneumatic, the speed of the trucks was increased materially, particularly on the seven mile dead haul to the plant and as a result of all these changes the gallonage delivered was increased approximately 10%.

5 Ton and 2 Ton White Trucks used for the transportation of briquets and general hauling.

These trucks average approximately 1500 miles per month each and deliver approximately 135,000 gallons per month each. The cost of operating during the past year has been 18c per mile and 91c per hour. The new unit or semi-trailer job has a tank capacity of 2500 gallons and is so designed that the weight per axle does not exceed 14,400 pounds and the total weight of the vehicle, six axles, is less than 34,400 pounds when loaded. This equipment when loaded has a maximum speed of 26 miles per hour with a drop to 23 miles per hour on light grades. It has been in operation practically two months and during that time the operators found, that it can be handled as conveniently as a four wheel truck. While there is no average data yet available on the results obtained by this truck, during the first month of operation it was driven 1850 miles over a very scattered territory and delivered 140,000 gallons of Gasco Motor Fuel. By reason of the fact that this truck is capable of carrying so large a volume many trips to the source of supply have been eliminated and it is expected that this truck will deliver from 25 to 30 thousand gallons more per month than the other trucks now in operation. In various respects the design and construction of the truck differs from the conventional and since the unit was placed in operation it has been found a still greater reduction in weight could be affected if another unit were being built. No vehicle ever used by this company in the past has had the carrying capacity per pound of vehicle that this has, and as a study of its operations progresses, there will undoubtedly be changes which will reduce the weight of the vehicle at least another 2500 pounds. All of these reductions result in increased pay loads which means more economical transportation.

EDUCATION AND BUSINESS

How education and business can be brought to focus upon the universal problem of getting on in the world with which every individual is confronted is one of the questions to which the Civic Development Department of the Chamber of Commerce of the United States is directing its attention.

"The problem of the conservation of manpower," says E. F. Fowler, in charge of the Department's educational activities, "has always occupied the attention of business. While success in the industrial world calls for a weeding out of misfits, more and more it is being recognized that much of the labor turnover can be prevented and much effort as well as money saved, if more scientific methods of selection, training and placement are used. Conservation of the individual through the development of his capacities for usefulness is a common problem challenging the best efforts of education and business.

"Both have a stake in that period of transition between the school life and work life, when so many young people who through maladjustment flounder from one job to another. It is a field for practical cooperation. For the schools to be of greatest service they must know more accurately what the requirements of the work life are."

A plan to accomplish this purpose is being tested by the Chamber of Commerce of Springfield, Mass., and the Baltimore Association of Commerce with the cooperation of the National Chamber.

EXPLOSIBILITY OF VARIOUS COALS

During the past 15 years the United States Bureau of Mines, Washington, D. C., at its experimental mine near Pittsburgh, Pa., has tested mine-sized dust prepared from coal taken from 29 different mines in different parts of the country. These range in composition from the anthracites of eastern Pennsylvania to the high volatile coals of Utah and Wyoming. The amount of incombustible material required in a mixture to prevent propagation of an explosion under standard propagation test conditions was determined for each coal. It was found that 20% was sufficient for a coal whose ratio of volatile to total combustible was 0.15, but the quantity increased rapidly with increasing ratio and 61 per cent was required with coals whose ratio was 0.23. There was then no further increase until ratio 0.40 was passed; that is a coal having a ratio of 0.40 required 61 per cent incombustible in the mixture the same as a coal of ratio 0.23. Beyond ratio 0.40 there was a slow increase and 70 per cent incombustible was required for coals whose ratio was 0.50. It is felt that these limits are known with sufficient accuracy to justify applying them to any coal not tested in the experimental mine. Composition is one of six factors which influence the explosibility of coal dust and a paper summarizing the present knowledge of all six is in preparation for publication by the Bureau.

Mechanizing the Gas Office

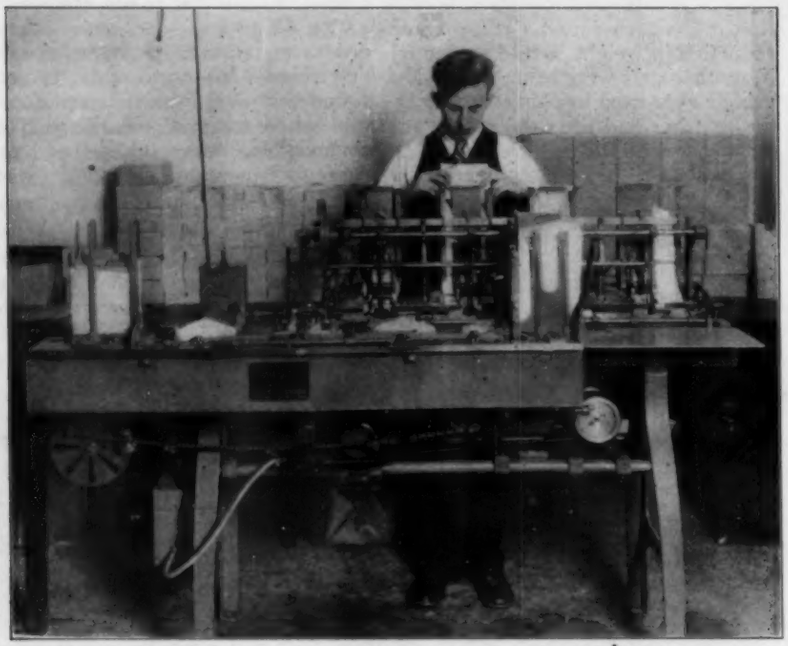
By G. L. Harris

IT is hard to believe that there was ever a time when business letters were not written on the typewriter. It is harder still to believe that anyone could reasonably oppose the introduction of the typewriter, once its speed and economy and legibility were proven. Yet the typewriter had a hard time when it first was put on the market.

Today there are business machines of every type everywhere. Loose leaf ledgers, adapted to machine posting, have replaced the cumbersome bound books of the past. And in many gas offices even the consumers' ledgers themselves have been replaced by the new stub billing method.

Machines have not only shown us how to do our work better, but they have shown us that in many cases we were doing unnecessary work. And with the intense competition that the manufacturers of office machines have to face they have developed systems and engineering departments to improve not only their machines but to improve the systems on which their machines are used.

To these manufacturers of office appliances and machines, we Public Utility men are deeply indebted. Hardly a manufacturer but has Public Utility specialists at work on our problems. In many cases these men are expert accountants. In many cases they are drawn from our own ranks. And in every case they have something worth listening to and thinking about.



This envelope stuffing machine, used in the Bill Delivery Department of The Peoples Gas Light and Coke Co., Chicago, fills 20,000 envelopes each day with four inserts in each envelope.

In this article it is not our purpose to exploit the machines of any manufacturer. If we name names it is for the sake of clearness and direct explanation. And if we tell you about machines with which you are long since familiar, it is not that we underestimate your knowledge of the progress that has been made. It is rather because we hope to be of service to the great body of our readers who are interested in every new development that tends to more efficient office procedure.

Nor do we hope to cover the entire field of machine applications to gas office problems. Rather we shall discuss the outstandingly successful machine developments and certain of the more unusual machine applications.

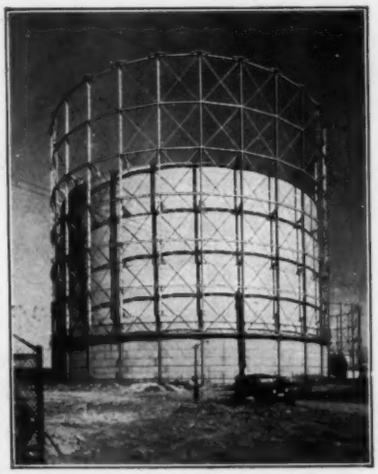
The Addressograph

All of us know something about the Addressograph. We know that customers' bills are addressed rapidly by the use of Addressograph plates.

But in its uses in the Gas office the Addressograph has become far more than an addressing machine. There are more than a thousand different combinations of Addressograph equipment, from a portable check imprinter to a dupligraph which types complete letters—complete with name, address, date, salutation, body of letter and signature—all in one operation.

There is an automatic check signing machine—used in gas companies

ENGINEERS and BUILDERS GAS HOLDERS and TANKS



A Cordial Welcome awaits visiting Gasmen in Booth 85

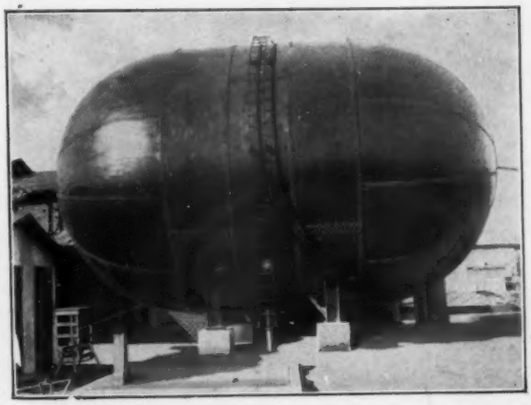
Gas holders are capital investments and holders by Stacey Bros. assure a long life for that investment. It is real economy to buy Stacey Bros. Holders and they can be supplied in any capacity.

The illustration at left shows the ten million cubic foot holder erected in Buffalo, N. Y., in record time, and a duplicate erected in Long Beach, Cal., eclipsing record made in Buffalo, which prove conclusively our

"ABILITY TO SERVE"

STACEY BULLET

A pressure holder of unlimited capacity, unsurpassed for sound engineering and designed to eliminate faults inherent in other types.



PURIFIERS

Designed on a conservative basis and users are assured cheap operation and maintenance. The capacity is calculated to purify gas at a minimum of cost.

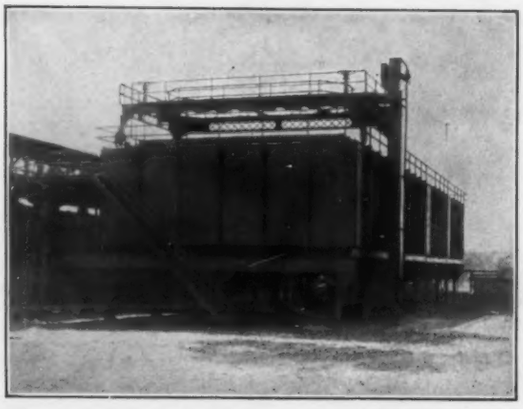
STACEY BROTHERS

GAS CONSTRUCTION COMPANY

CINCINNATI -:- OHIO

JAMES E. STACEY, Pres. ARTHUR A. POPE, Sec. and Treas.
ANDREW J. STACEY, Vice-Pres. WILLIAM A. MILLER, Chief Eng.
WAYNE STACEY, Gen. Sales Mgr. P. C. RODGERS, Asst. Sales Mgr.

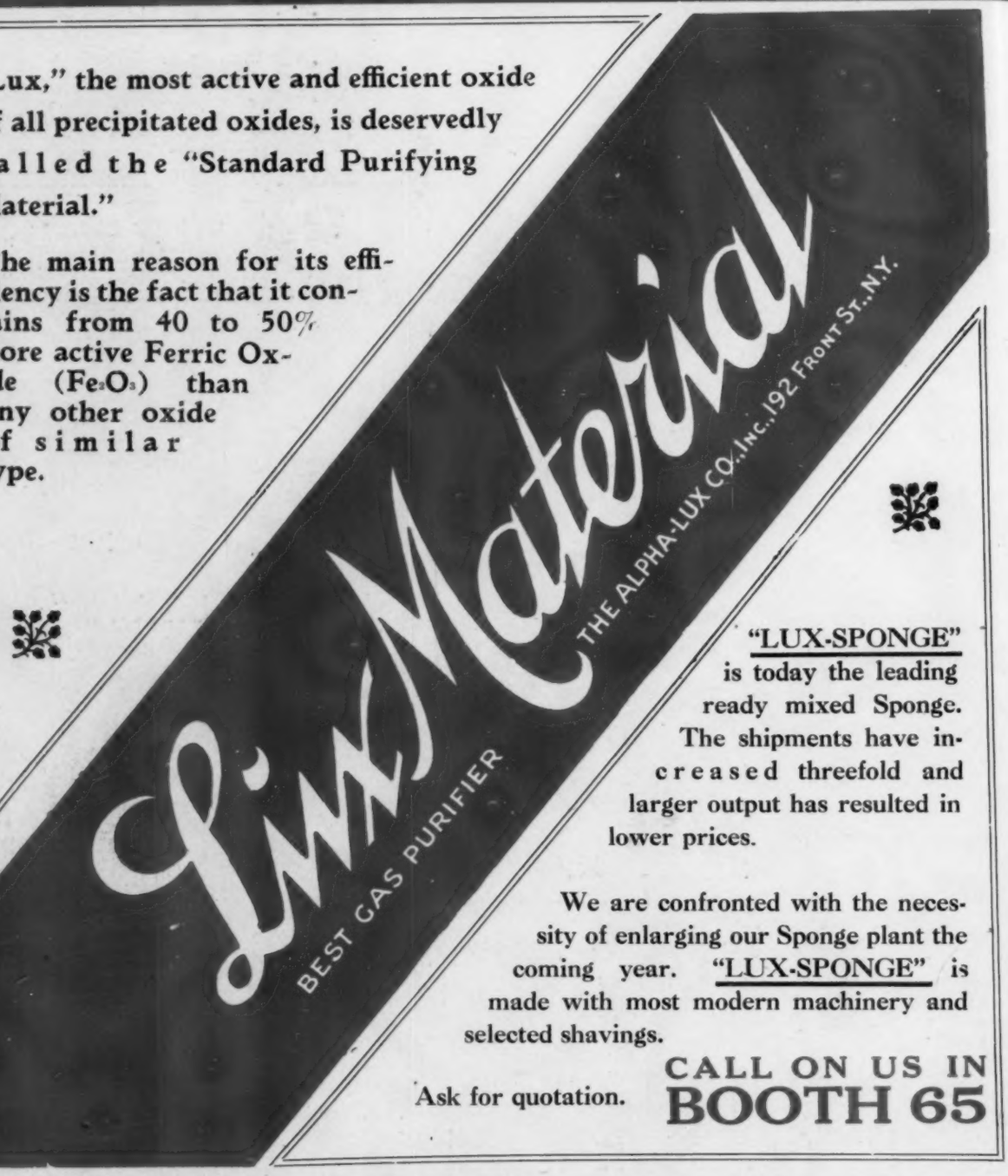
NEW YORK OFFICE—75 West Street—P. F. McEnaney, Mgr.
New England Representative—Eastern Service Co., Boston.



The Stacey Bros. (J. E. and A. J. Stacey) are the Pioneer Holder Builders of America

"Lux," the most active and efficient oxide of all precipitated oxides, is deservedly called the "Standard Purifying Material."

The main reason for its efficiency is the fact that it contains from 40 to 50% more active Ferric Oxide (Fe_2O_3) than any other oxide of similar type.



"LUX-SPONGE" is today the leading ready mixed Sponge. The shipments have increased threefold and larger output has resulted in lower prices.

We are confronted with the necessity of enlarging our Sponge plant the coming year. "LUX-SPONGE" is made with most modern machinery and selected shavings.

Ask for quotation.

CALL ON US IN
BOOTH 65

"LUXIT H.T." Cement (Dry)

For Patching Hot Retorts, Refractory Linings, etc. Shipped in 110 lb. bags.

Order Sample Shipment Today!

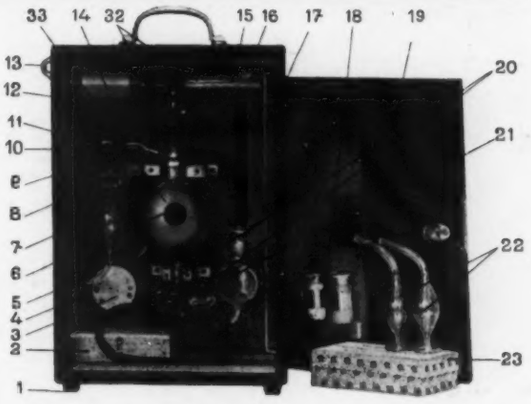
THE ALPHA—
192 FRONT STREET

HAND CALORIMETER

Dr. Strache-Kling (Loeffler Model)

For Determining the Heating Value of Gases

1. It is portable (weight under 10 lbs.)
2. It is accurate.
3. It requires only small quantities of gas for each determination.
4. It requires no water connection
5. A determination can be made in one minute.
6. It can be operated by anybody without special training.
7. It does not require standardizing by H_2+O gas
8. Its cost is reasonable.

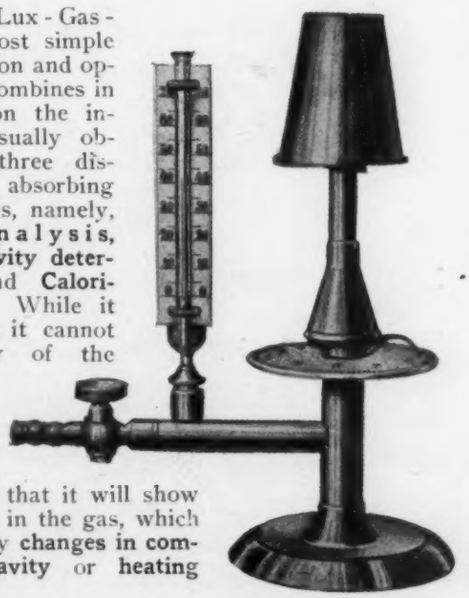


The principle involved is the burning of an air gas mixture, of a known quantity of gas with a definite volume of air, in an explosion pipette insulated by means of a Dewar Vacuum jacket.

The temperature rise is recorded on an inserted thermometer. Each instrument is equipped with a computer table.

DR. OTT-LUX-GAS TESTER

For Indicating Change in Gravity of Gas, also in Heating Value of Gas



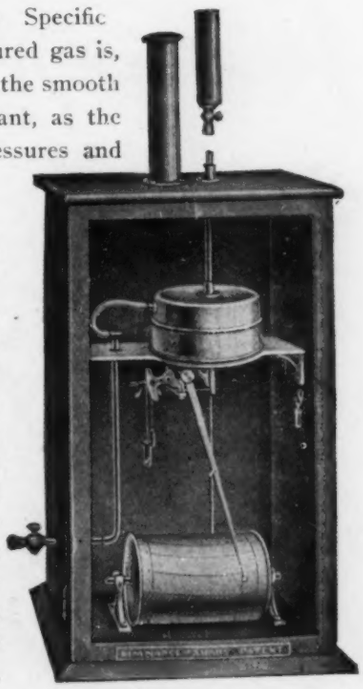
Dr. Ott-Lux-Gas-Tester is most simple in construction and operation. It combines in one operation the information usually obtained by three distinct time absorbing manipulations, namely, the **Gas Analysis, Specific Gravity determination** and **Calorimeter test.** While it it true that it cannot replace any of the three tests, where specific results are required, it is equally true that it will show any changes in the gas, which are caused by **changes in composition, gravity** or **heating value.**

LUX-RECORDING GAUGE

For Specific Gravity of Gas

(Simmance and Abady System)

To determine the Specific Gravity of manufactured gas is, today, as essential to the smooth running of a gas plant, as the determination of pressures and heating values.



In the Simmance Abady System-Lux-Recording Specific Gravity balance, we have an instrument which will give us, at a glance, not only any changes that may have occurred at any time, but furnishes a permanent record of the Specific Gravity of the gas throughout the 24 hours of the day.

A—LUX COMPANY INC.

EET NEW YORK CITY, N.Y.

COMPANY MEMBER OF AMERICAN GAS ASSOCIATION

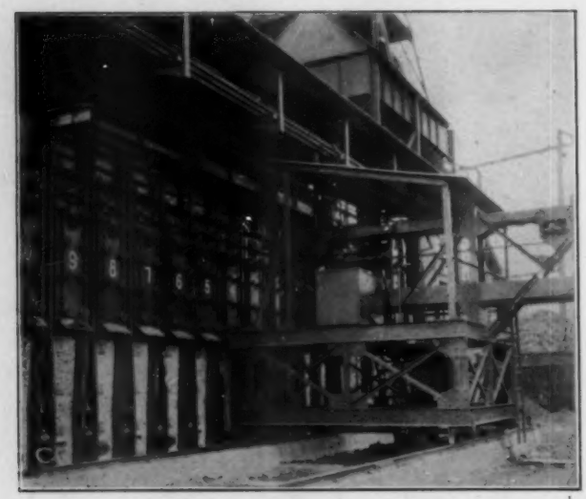
TO BETTER SERVE
THE GAS INDUSTRY

Specialists in Coal Gas Plants

One of the chief problems confronting the Gas Industry today is the "production cost of gas."

We firmly believe that the economic soundness of coal gas manufacture is a definite answer to this problem for now and for the future.

"Russell Built" Ovens



"Improved" Unit Ovens

We as Specialists in coal carbonizing plants will be glad to tackle your problem and to offer you a remedy which will be both logical and effective.

Visit our Exhibit
Booth No. 211

Main Office
24 State St., New York

Branch Office
205 W. Wacker Drive, Chicago, Ill.

IMPROVED EQUIPMENT — RUSSELL ENGINEERING
NEW YORK — CORPORATION — CHICAGO

for preparing dividend checks and payroll checks.

Automatic—that is the adjective that is applied to practically every Addressograph product, and that is actually the way they work. All of us are somewhat familiar with these machines. But few indeed are familiar with their possibilities in the Collection Department, Payroll Department, Investment Department.

Office Problems Studied

We have mentioned the Research and Systems Divisions of the manufacturing companies. None has a more extensive one than the makers of the addressing machine. They have studied the problems of others who are doing the same work we are doing and we find that invariably they have suggestions worthy of our time and attention.

There are numerous bookkeeping and billing machines on the market, machines that do everything but talk. In fact they are more than human.

In one operation the modern billing machine writes the gas bill, writes the cashier's stub, posts the ledger, makes up the sales audit or recap sheet, and accumulates both the revenue and consumption as it goes along. It writes the bills much faster than they can be written by hand and far more accurately. It writes bills that are neat, legible, and businesslike in appearance. And it proves the bills for correct writing and consumption.

It makes an original bill and an original ledger. The figures printed on the bill automatically repeat print on the stub and ledger.

Which machine is this? Why, any one of the several machines that are available today.

Billing Article

It is not at all our purpose to go into the complete routine of billing as it is carried on in any one company. But we do wish to refer those who are interested in what can be done with machines on this job to an article by W. Evans, Special Accountant, writing for the Burroughs Adding Machine Company on the system used by The Pacific Gas and Electric Company. This article is entitled "Automatic Machine Billing and Ledger Posting" and may be secured from any Burroughs office.

The Burroughs machine used by the Pacific Gas and Electric Company automatically accumulates and automatically prints the following totals as the bills are made:

Prior Readings
Present Readings
Consumption
Current Month's Charges
Unpaid Balances
Totals of Bills

Burroughs machines are probably the best known and most generally used, and the new developments that have been incorporated into their latest billing machines are very much worth seeing. They not only carry a large number of totals, but they greatly facilitate the work where there is more than one item to a bill, such as combination gas and electric bills, bills where it is desired to add on merchandise charges or arrears.

Another extremely interesting application of Burroughs machines is described in an article by Walter Benning, General Auditor of the Southern Colorado Power Company. The article deals with the "Byllesby Bill Register System of Customer Accounting." Mr. Benning's company handles 12500 accounts with one Burroughs machine, and his article explains the method in detail, illustrating it with forms. This likewise can be secured at any Burroughs office.

Cincinnati practice

The Union Gas and Electric Company of Cincinnati uses the Dalton Adding Machine. This company's billing machine and their system is described in a booklet issued by The Dalton Company, which shows in detail all of the forms used and explains every step of the operation. The particular features of the Dalton machines are ten keys and touch operation. The speed and accuracy that even an inexperienced billing clerk can develop on this machine is remarkable.

Machine billing and particularly ledgerless billing is the accepted method, and we have tried merely to call attention to certain outstanding examples of applications or of available literature on these applications. Consequently if we omit details of Elliott Fisher and Underwood machines, it is not because they are not successful or efficient, but because we wish to cover other aspects of the mechanization of the gas company offices.

For spectacular and even uncanny machine work the punch card machines are unique. These machines were first used in the Census Bureau at Washington. The foundation of the tabulating system which these machines have developed and perfected is based on the use of cards known as "tabulating cards." They are 7¾ inches by 3¼ inches and are divided into forty-five columns. These columns are divided into "fields" according to the information desired; some "fields" having but one column while others have more. The information is derived from perforations made in this card by means of a punching machine.

These perforations have numerical value and the information desired is represented by special codes.

Punched card records

The punched cards are sorted automatically at the rate of 12000 per hour, in a sorting machine. There is also a tabulating machine which counts the cards and totals any particular information desired, from the punches representing that information.

The applications of the punched card records are many and interesting.

Meter Records are kept on punched cards, Payroll Records and Customers' Deposit Records are kept on them. Time and Material distribution is made by means of these cards. And they are used also in handling records of Installment Accounts, Stock Transfer, Inventory, Taxes, Group Accident and Insurance and Fire Insurance. An unusual use is made of them by the Niagara Falls Power Company to record visits made by people inspecting their plant.

The International Business Machines Corporation has a number of booklets on the use of punched cards in Public Utility Work. Among them are plans for handling Accounts Receivable, Payroll and Cost Accounting, and Service Order Control.

Duplicating Machine

The Powers Accounting Machine Company has developed the punched card machines to the point of printing names as well as figures, and their booklets on Public Utility applications are also available.

When more than three or four copies of any paper are needed the duplicating machine is necessary. There are several of these, depending on the number of copies needed

and the kind of material to be produced.

The Ditto machine reproduces up to one hundred copies from one impression. Forms may be printed entirely in ditto ink, and typed with a ditto ribbon. Purchase orders, sales orders, bulletins, charts—all are reproduced by these machines which are so simple that any boy can operate them.

Electric drive

The Mimeograph machine reproduces from stencils and it may be used for even such complicated material as the company house organ. Electrically driven machines are almost as fast as printing presses, and many gas companies use them for printing forms. In fact some companies insist that all new forms shall first be printed by mimeograph, and printed in quantities only after actual use has proved that the design of the forms is satisfactory.

The Multigraph is used for a larger number of copies. It prints from type or from plates, curved to fit the revolving roll of the machine. Electrically driven Multigraphs can produce 6000 printed forms an hour.

The postage meter machine is coming into general use in gas companies. Instead of stamps this machine prints the postage insignia, for which a permit is secured from the local post office. The impressions are totalled by a meter to which the post office has the key, and which safeguards both the gas company and the government. Where gas bills are mailed daily, as in most larger companies, this machine, which stamps and seals in one operation, is a decided economy.

And in the Peoples Gas Light and Coke Company, of Chicago, there are now two bill stuffing machines which are almost human in operation. Each machine is capable of doing the work of three or four persons. Its touch is lighter than the finger tips. It picks up a bill, a Gas Gazette (which is a little human interest folder mailed to every customer), and two mailing cards. It opens the envelope, places the four pieces in it, closes the envelope and seals it.

All of the inserts are folded (and there are folding machines which will fold a paper any way you want it folded) before being placed in the hoppers, of which there are four. A rubber and steel roller draws these inserts from the hoppers where they are picked up by grip arms and deposited on a conveyor chain. This chain passes before each hopper, collects one of each insert, and places them in front of a pusher which guides them to the envelope.

So delicate is the machine, that should an extra piece of paper of even the smallest thickness get into the envelope, the machine stops until the condition has been remedied. In the same way, should one of the four inserts be missing, the machine stops until the condition has been remedied.

The capacity of these two machines is 30,600 envelopes per day or 795,000 in a month of 26 working days.

Nor should we forget the machine which telegraphs writing. The main show rooms of the modern gas company are not filled with records and occupied by clerical work. They are devoted to the display of merchandise and to the comfort of the customers.

Other Machines

But the records must be just as readily available as when they were physically at hand. If a customer wants his deposit refunded, the clerk who authorizes the refund must first find out if the final bill has been paid.

The clerk writes on a pad at his elbow. Instantly the words he has written appear on a similar pad on the desk of a clerk in the Consumers' Accounting Department. This clerk investigates the customer's account and writes his answer on the pad. So far as ease of reference is concerned the records are actually present at the counter to which the customer comes.

Then there is the Autocall, which calls any one in the building to the telephone no matter where he may be. And the automatic time stamp which tells the exact hour and minute a paper was received or dispatched at any point. No interdepartmental routine can function efficiently and without friction unless accurate, clear time stamps are used. The old fashioned rubber stamp, which smears, gets lost, requires daily and even hourly adjusting, is out of place in the modern gas office.

These are not all of the machines. We haven't mentioned nearly all of the applications. There is the Lamson pneumatic tube system, the automatic change machine for cashiers, the signagraph which signs ten checks at a time, the fanfold billing attachment which feeds a continuous strip of forms through a typewriter and reproduces a number of copies without the insertion and removal of carbon. And many more.

If there is any machine mentioned in this article that you don't know about, or about which you don't know the latest developments, you owe it to your company to investigate. If you are not taking advantage of the researches of the trained engineers who are representing the manufacturers of these machines, you are missing something important.

KEEPING A RECORD OF WASHING MACHINE CUSTOMERS

The Portland Gas & Coke Company, of Portland, Oregon, has a very effective method of keeping track of washing machine customers.

When a washing machine account is put in the merchandise ledger, a 3 x 5 card is also made up giving the customer's name and address and the number of the gas ledger account, also the due date of the gas account.

These cards come to the Collection Bureau where they are filed in a date file to a date five days in advance of that shown on the card as the due day of the gas account, thereby making the file date twenty days in advance of the debit date of the gas account. Each morning the merchandise past due bill writer refers to this file and withdraws the cards for that particular date and refers to the merchandise account for each card. Accounts shown not to have been paid are written past due and the past due bill sent to the collection men who call the customer's attention to the past due condition of their account.

This company has approximately 800 of these cards, which means that the bill writer must check an average of 27 cards each day. Out of these 27 cards checked each day an average of eight accounts are written past due each day. When all cards for the particular date have been checked they are returned to the date file to be checked again the next month.

Mechanization in Selling and Utilization

The Idea Itinerant

By O. B. Server

DID you ever see a load of coal? Did you ever size up a load of wood? Then look at the tremendous cube built on a large truck which was entered in the Industrial Parade of the Rose Festival at Portland, Oregon.

Is it not astounding when you behold what a thousand cubic feet look like?

The black lettering on the snow-white background made this enormous cube stand out above all things and certainly impressed the crowds who watched the parade from windows and sidewalks with the marvelous cheapness of Gas as a fuel. (In the photograph, no people are shown because the picture was taken just before entering the parade and the people had deserted their homes and stores to be on the route of the parade.)

Another float entered by the Portland Gas and Coke Company in this same parade of the Portland Rose Festival was a Smoothtop and a work-table mounted on a truck and the "King of Dolls" dressed up as a French chef doing his stunt or rocking back and forth. As the crowds on the streets were getting hungry, there was a great clamor for the biscuit which the "Mechanical Man" took out of the oven but always put back again. When the parade was over, the performer was so dead-tired that he flung the biscuits, plate and all, into the vacant lot and was ready to drop dead, for he had been jostled along for more than three hours, holding himself stock-still except when he was marching back and forth between the work-table and the Smoothtop Gas Range. He would pound the table with the rolling pin to make a racket, but the crowd was more interested in the biscuits than in the noise.

A Robot needed

In the years to come, perhaps, mechanization in this wise will be carried out to the last letter, with a fatigue-proof robot doing the honors as chef.

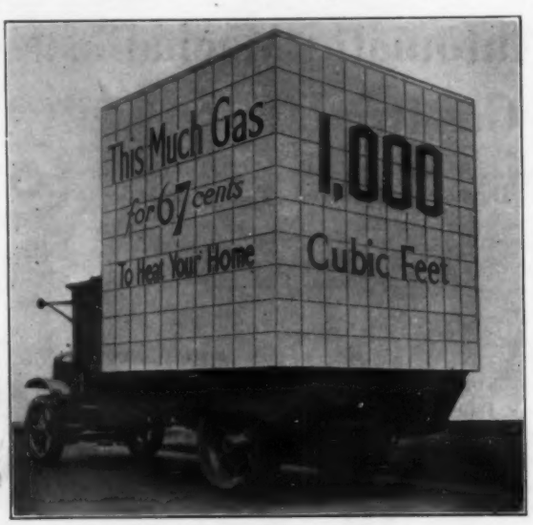
The Rolling Kitchen

By Norman B. Terry

The Laclede Gas Light Company

BACK in "the eighties" people stood in awe around the "medicine wagon" as a be-diamonded sorcerer performed feats of magic. Today in St. Louis a motor truck has replaced the "medicine wagon," a charming young lady has replaced the glittering sorcerer and instead of meaningless patter she speaks words of information and instruction, but feats of magic are still being performed. On this motor truck is a modern kitchen completely equipped with a gas range, refrigerator, water cooler, demonstration table and incinerator. Daily this rolling kitchen goes into distant parts of the city to tell the magic story of gas cooking and to give Home Service demonstrations and instruction.

This portable kitchen is the result of many letters received by the Home Service department of The Laclede Gas Light Company from



Visualizing 1,000 cubic feet of gas

The Rolling Kitchen

women who were anxious to attend the Home Service cooking classes but who couldn't spare the time to come downtown each day. In order to reach these people it was necessary to take the classes to them. This is being done by means of the Home Service demonstration truck. Each morning the truck starts out on its daily pilgrimage to neighborhood markets and other places in the city where women congregate. An employee of the Home Service department accompanies the truck and gives demonstrations, preparing simple dishes such as biscuits, cookies and cup cakes. Pyrofax gas is used in the range and while the food is cooking the demonstrator distributes recipes to the crowd and answers questions relative to Home Service work.

Women have taken quickly to this innovation and the daily crowds continue to grow. Housewives have come to depend upon the free recipes for new ideas for their tables. And many letters have been received expressing gratitude and interest in these neighborhood demonstrations.

Automatic Mechanical Control of Gas-fired Industrial Appliances

Fundamental Principles Utilized in Automatic Temperature Control Devices Are Described and Limits of Applicability Pointed Out.

By A. D. Frydendall,
Sales Engineer, The Peoples Gas Light & Coke Company

AUTOMATIC temperature control devices for industrial gas-burning equipment are divided into two classes, according to their method of measuring heat changes:

1. Instruments of the expanding-medium type in which the expanding element may be a solid or a fluid.

2. Instruments of the thermoelectric type in which the current generated by a thermocouple is the basis for measurement. This division can again be subdivided into:

(a) Millivoltmeter controllers.
(b) Potentiometer controllers.

Expanding medium type

If two metal rods of the same original length, having a widely different coefficient of expansion are placed in a furnace and heated, it will be found that they have expanded and grown in length an amount which is proportional to the temperature increase and the coefficient of expansion of each individual rod. The rods originally of the same length will now be found to be of different length and it is that difference in length that is used in all thermostats to actuate the control valve.

In order to secure a greater difference in expansion than is possible with the metals customarily used, some manufacturers use a non-metallic material for the "non-expanding" member of the couple. As the difference in expansion between the two elements is a function of the length of a couple, it is possible to get greater total expansion by increasing the length of the couple. Practical consideration, however, has limited the length of most thermostats from 15 to 18 inches, and any greater movement that might be necessary to properly operate a control valve is secured by a system of multiplying levers.

It is interesting to note that by the use of the principle of expansion and contraction of metals as employed in thermostats, it is possible to develop large forces, and ample power is available for operating valves. Because of this, the manufacturer of thermostats does not have to resort to delicate constructions to accomplish the desired results, but can build an instrument rugged in design which will insure satisfactory operation if properly installed.

Higher Temperatures

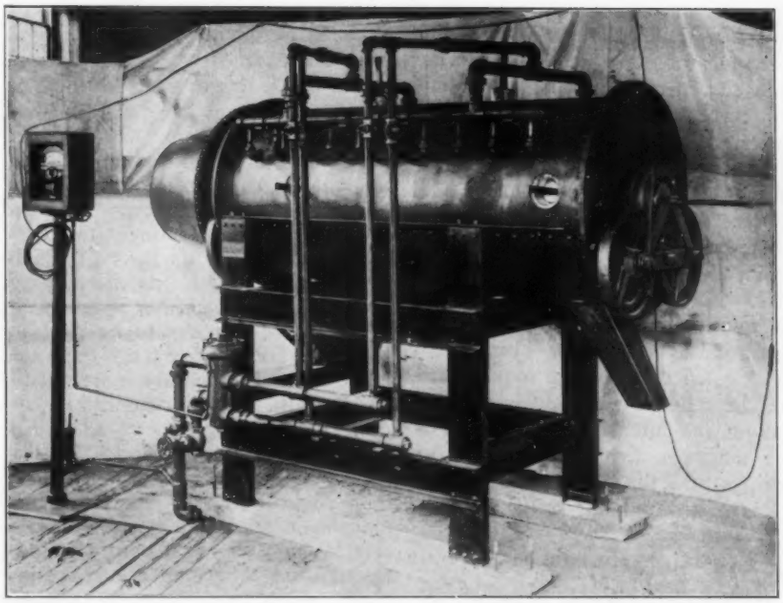
Instruments of this type are suitable for temperatures up to about 800° F. At temperatures above that figure, unless special materials are used, metals lose their rigidity and become plastic, with the result that the thermostat becomes unreliable and fails to maintain the temperature for which it was originally set. The exception to this rule is the Robertshaw type of thermostat which, because of the use of special materials, can be employed at temperatures up to 2000° F.

If a sealed bulb containing a gas is placed in a hot oven or furnace, the gas will increase in volume one four hundred and sixtieth part for every degree Fahrenheit increase in

temperature above absolute zero. This property, first discovered by Charles, is made use of in indicating thermometers to measure temperatures and in thermostats to control the flow of heat to the furnace. In actual practice the bulb containing the gas projects into the furnace and the pressure developed in the bulb due to the increase in temperature is transmitted to the instrument head by means of a small capillary tube and serves to actuate the valve mechanism. Controllers of this type can be used for temperatures up to 1000° F. They offer an easy means of distant control up to fifty feet.

A Discovery

About a hundred years ago, in 1821 to be exact, Seebeck, a physicist of that time, noticed that if a circuit is formed composed of two wires of different metals joined together at their ends and if the junctions are at different temperatures, a current will in general be produced in the circuit. Thus, if two copper wires which are connected to the terminals of a galvanometer are connected at their other ends to an iron wire and one of the junctions heated, a current will be indicated by the galvanometer.



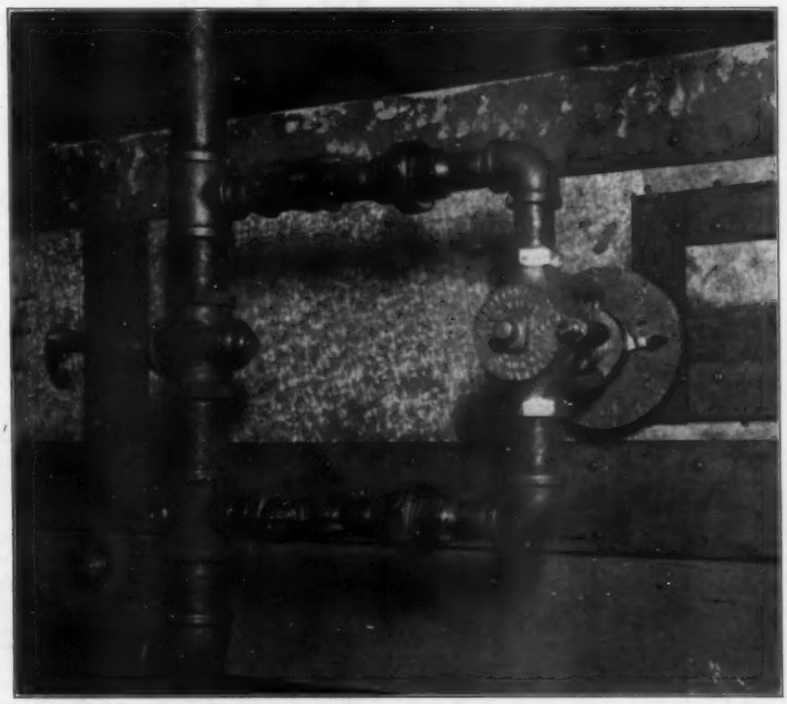
Application of control instrument of thermo-electric type in continuous spiral retort for hardening or tempering articles in bulk; the capacity of this machine is about 200 pounds per hour.

If while the cold junction is kept at a constant temperature, the temperature of the hot junction is raised, the current in the circuit will increase up to a certain point, called the neutral point. This principle is used today in all heat controllers which use a thermocouple. Two methods of measuring the generated current are known, the millivoltmetric and potentiometer methods.

Within certain temperature limitations, temperature measurements can be made by direct reading if the thermocouple is connected to a galvanometer indicating the magnitude of the e.m.f. developed due to the heating of the couple. This is true because the e.m.f. of a thermocouple has a definite relation to the difference in temperature between the hot and cold end of the couple. A movable coil of a D'Arsonval galvanometer will also be deflected to an extent that is directly proportional to the e.m.f. of the couple.

Measures Current

From this it would seem to be a very simple matter to connect the thermocouple to the millivoltmeter, calibrate the scale of the instrument in degrees for the temperature: e.m.f. relation of that particular couple, and assume the job finished. The instrument, however, which indicates or records the temperature does not measure voltage but measures the current that flows in the circuit consisting of thermocouple, lead wire, any switch contacts, and the instrument. The amount of current depends on the voltage of the thermocouple which, in turn, depends on the temperature at the hot and cold junctions of the thermocouple.



Application of control instrument of the expanding medium type controlling temperature of air in a continuous drying oven

From these facts it is seen that the galvanometer or millivoltmeter is a current reading instrument and its current readings should not be referred to directly as temperature indications. A number of other conditions which have to be considered. These factors are resistance of lead wire, resistance of thermocouple, and resistance of the instrument itself. All galvanometers of the D'Arsonval type depend for their operation upon current. The amount of the deflection of the moving element for a given current is dependent on the intensity or strength of the magnetic field, the force of springs and the number of ampere turns in the moving coil.

High Resistance

As the thermocouple is usually installed some distance from the instrument the source of e.m.f., which is the thermocouple, is not connected directly across the terminals of the instrument and in accordance with Ohm's law there will be a fall of potential along the line with the result that the moving element will receive a diminished current and will read low. To minimize such errors, the resistance of the instrument should be as high as possible so that the resistance of the line and couple become a relatively small part of the total.

In commercial practice, the maximum e.m.f. of a base metal thermocouple is approximately 60 millivolts. To measure such small e.m.f.'s accurately the instrument must have a high degree of sensitivity and at the same time be able to stand up under a certain amount of rough handling during plant use. The deflection of the moving element is proportional to the current flowing through the coil so that if the total resistance of the circuit is low, a large current will flow which furnishes a large amount of power to turn the moving element. Keeping the resistance in the circuit low, tends toward rugged construction and heavy springs, and not so much attention has to be paid to bearing friction. In other words, it is not difficult to construct a rugged and sensitive low resistance millivoltmeter pyrometer if accurate temperature readings are not required.

The objections to low resistance instruments has led to the making of instruments of higher resistance. This is accomplished by placing a high resistance of manganin wire in series with the moving coil. The number of turns on the coil has also been increased to insure proper sensitivity on account of the reduced amount of current flowing, due to the increased resistance. This increased resistance reduces the current flowing through the coil which is the power that turns the moving element. As this power is lessened, greater attention has to be paid to bearing friction, lighter springs must be used which are more apt to fatigue and the instrument in general is not as rugged or as "dead beat" as the low-resistance instrument. Attention to mechanical details, ruggedness and superior workmanship often make it more advisable to choose an instrument of low resistance rather than a high resistance millivoltmeter simply because it is called a high resistance pyrometer.

The cold junction of the thermocouple in a pyrometer installation is at the point where metals dissimilar to those used in the couple are connected into the circuit. The cold junction will be at the head of the couple if copper leads are used to connect the couple to the instrument or the cold junction may be at the instrument if compensating leads are used to connect the thermocouple to the instrument, which have the same temperature millivoltage characteristics.

An e.m.f. is developed at the cold junction dependent on its temperature and this in turn opposes the e.m.f. developed at the hot junction of the couple. The total e.m.f. in the circuit measured by the instrument is the difference between the two. Nearly all base metal thermocouple temperature e.m.f. curves are approximately linear, so that temperature measurements would all read low by an amount equal to the cold junction temperature of the thermocouple if there was no means of maintaining this temperature constant, and correcting for it, or of compensating for temperature changes at this point.

What About the Mechanical Window Display?

By Ray Martin,

Chairman Window and Store Display Committee, American Gas Association

"THINGS are seldom what they seem."

While wandering down an Avenue any one of us has noticed—perhaps a hundred feet ahead—a sizeable group of people peering into a show window. A little closer, and we are conscious of a spirit of keen interest.

Now we, too, are looking over many heads into the window. We are in an uncomfortable attitude, but surely something interesting must be going on. Oh, yes! we can distinguish what looks to be the head of a monkey. It's moving! The head turns one way and another, very realistically.

As a few of the people in front leave and we become more expert in "edging in," we get a better view of the display. Our first surmise was correct. It is a monkey; a mechanical monkey sitting on its haunches while it raises several cards, one at a time, from a box. Its head moves to one side as it raises a card. It seems to be breathing, too. This mechanical monkey, we agree, is really a clever reproduction. After another look and a few more chuckles, we move on to give someone else a chance.

At supper that evening, dessert is prefixed by our account of "The best window display we ever saw." We describe in detail just how the monkey turned and twisted. We mention the large crowd in front of the window as proof of our statements.

"But," says Madam, "what was being advertised?" You can't tell her and few if any of us could. No one

remembers, because "the monkey" absorbed all our interest.

It attracted us to the window, and even after we were there, it continued to hold our attention. It advertised "monkeys," not the gas toasters on display.

Mechanical Novelties

Movement in window display advertising is beyond comparison when it is cleverly incorporated into the display. For instance, if we use motion to animate flies swarming around a garbage can, we are apt to produce an incineration display of real worth. Realism in this case would determine the value of the movement. The subtle use of steam in connection with water heating displays is good, because it is directly related to the product being displayed. However, the one hundred and one mechanical novelties used merely to attract attention have no place in our display advertising.

Let us return to the crowd attracted by one of these "monkey" displays. In a word—such a crowd looks good. The display manager responsible for it is probably overjoyed. He generally looks up his superior and personally conducts him to the window. Again—the crowd looks good. One would think that all gas toasters within miles would be sold before sundown. But at the close of business that evening we find they are not. The crowd we have tempted is not a buying crowd.

In conclusion, we offer one suggestion: Exercise the greatest care in employing movement in your window display advertising. Consider each use separately. Before you buy any mechanical device, be sure that it will assist in attracting BUYERS.

RESEARCH HELPS INDUSTRIES TO SOLVE SALES PROBLEMS

What is the best way to distribute merchandise? Is it through jobbers, through independent retailers, through chain stores or direct to the consumer? How can each salesman be made more effective? How can relations with dealers be improved? These are a few of the questions considered in "The Use of Research in Sales Management," one of a series of reports on a New England Survey issued by the Policyholders Service Bureau of the Metropolitan Life Insurance Company.

According to the report, no one plan of distribution will fit every need, and the best method for any one company can be determined only after careful investigation involving both the market and the product.

Such topics as bettering production, reorganizing sales departments, sales supervision and improving dealer relations are discussed in this report, and actual cases are presented to illustrate and back up each statement. The facts were gathered by the Bureau during visits to over three hundred New England Companies at the request of the New England Council.

"The Use of Research in Sales Management" is the fifth booklet to be published in a series on applying research to sales. Copies of it, as well as the previous issues, may be obtained on request to the Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison Avenue, New York.

UNBURNED COMBUSTIBLE FROM COKES USED IN DOMESTIC FURNACES

One of the desirable properties of a fuel for use in domestic furnaces is that it should be possible to allow the fuel bed to burn until only a small quantity of unburnt fuel is left and yet be able to add fresh fuel without the fire going out or without the use of kindling. Cokes give more trouble because of failure to start the fresh charge than do coals.

The quantity of unburn coke left in a furnace when the fire is allowed to burn itself out is one measure of this ability to start a fresh charge. Measurements of this unburnt fuel have been made in a series of tests being conducted at the Pittsburgh Experiment Station of the United States Bureau of Mines, Department of Commerce. The quantity of unburnt fuel increases with the size of the coke pieces as fired. This increase was found to be approximately proportional to the mean screen size of the coke up to 1-¼" mean screen size; above this size the rate of increase tends to be less. The quantity of unburnt fuel decreases slowly as the rate of burning increases, this decrease being more rapid for rates of burning below 2 pounds per square foot per hour. The quantity of unburnt fuel varies with different cokes. It does not appear to be related to any one other quality for high-temperature cokes, but light weight cokes gave lower residue. The combustible residue from the low-temperature coke tested was lower than for the high-temperature coke.

INERTS IN COAL

An investigation of the effect of inerts in coal on its utilization has just been undertaken by the United States Bureau of Mines at its Pittsburgh Experiment Station. This work, which is being done in cooperation with the Carnegie Institute of Technology and the Pittsburgh Coal Company, will deal primarily with the effect of "fusain" or mineral charcoal on coking properties of coal and with the effect of ash constituents on clinker formation. Several mines of the Pittsburgh bed have been sampled and the coal benches are being analyzed separately for distribution of inert matter. Coking

TECHNICAL AND GENERAL MISCELLANY

THERMAL INSULATION OF RETORT SETTINGS

Heat losses through walls due to conduction with subsequent radiation and convection from the surface open to the atmosphere can be minimized in a number of ways. The thickness of the protective brickwork can be increased. Part of the brickwork may be substituted by material with lower heat conductivity. The emissivity values of the external radiating surfaces may be decreased. Cracks may be filled, pointing of joints resorted to and the outer walls of the setting may be correctly tied. Modifications may be made in the design of the setting.

In examining the insulation of horizontal settings, it was found that either insulation was an after-thought, or else the insulation was incorporated in the original design. Thus, insulating coatings are applied to the outer surface of the setting in the first case. Insulating brickwork was also placed on the outside of the setting. While some insulation is effected in this manner, retort house conditions opposite such walls cannot be called any better than those opposite uninsulated faces.

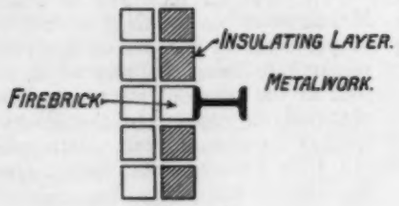


Figure 1

When brick is used to secure insulation by external facing, then the brickwork immediately behind the metal bracings should be of ordinary red brick, and the remaining face of the brickwork can consist of insulating material with exposed surface flush with the inner flanges of the bracings. In this way expansion strains would be carried by masonry of high mechanical strength, metal work temperatures would be considerably reduced, and the insulating blanket would effect its usual reduction in radiation and convection losses from the fully exposed faces of the walls. This arrangement is shown in figure 1. It is also possible to cut away the insulation concentrically so as to avoid overheating of the mouthpieces. Or a special layer of insulation may be inserted within the retort at these positions, thus lowering the temperature of the inner ends of the metal work. (see figure 2).

In providing insulation in the original design of the setting, certain guiding principles must be adhered to. In the first place proper means should be provided for protecting the insulating blanket against disintegrating effects, for the insulation has but low mechanical strength and small resistance to abrasion.

When the insulating blanket is incorporated with the setting of the furnace so that it is protected mechanically, then care must also be taken to see that it is not subjected to too high temperatures. These will cause shrinkage and the resulting air gap or flue will easily nullify the entire advantage of the insulation. If a zone of insulating brick is placed between the inner and outer brick layers of the walls of the setting, some type of tieing between these inner and outer walls is desirable. Otherwise structural instability will later develop.

The following precautions must be taken in the insulation of horizontal settings. A diatomite type of brick should be used for wall insulation. It should be included within the wall away from disruptive influences. It should be kept sufficiently distant from the inner surface so that shrinkage is prevented with resulting loss of insulation capacity. The inner and the outer firebrick walls should be rigidly tied together. Overheating of the metal fittings should be guarded against, as well as mouthpieces and the like on the front and back walls. Insulating plugs should be used in the sight holes.

For top insulation a four and one-half inch course should be applied on the outside of the roof. The metal work should be guarded against overheating.

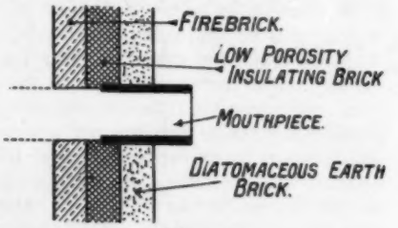


Figure 2

In both cases it is advisable to use a minimum of efficient heat insulating cement. Shapes should be used as large as possible so as to avoid a higher conduction loss through the joints. Tongued and grooved shapes should be used so that in the event of the joints opening, direct radiation from the hot face in front of the insulation is obviated.

Thermal insulation of vertical retort settings possesses as its principal advantage greater comfort for the men operating the plant. Insulation on the top of the bench has an additional advantage in

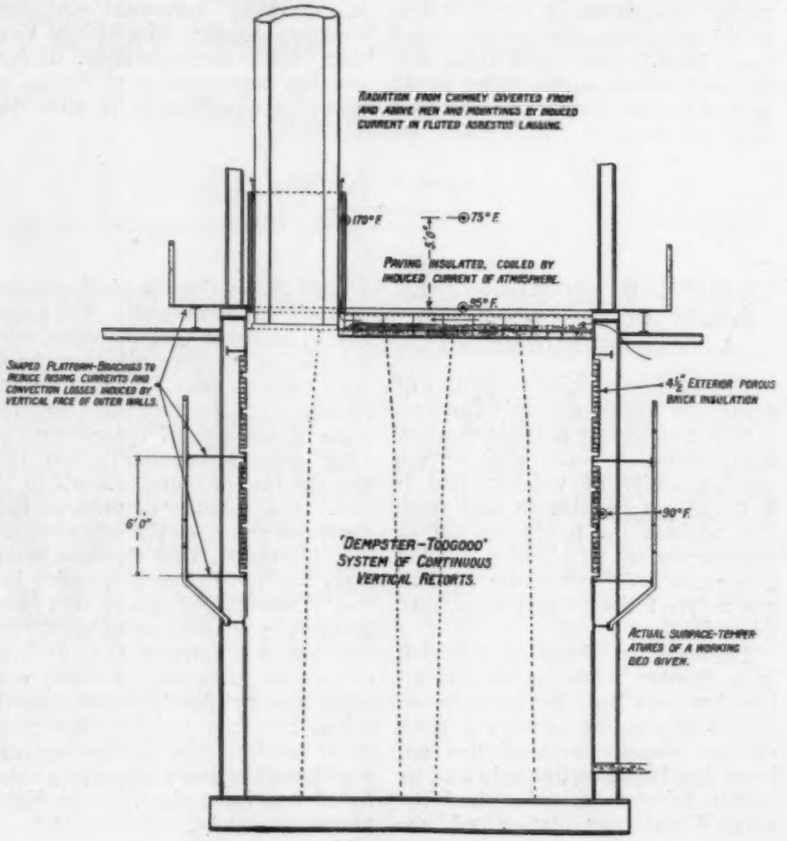

RADIATION FROM CHIMNEY DIVERTED FROM AND ABOVE MEN AND MOUNTINGS BY INDUCED CURRENT IN FLUTED ASBESTOS LAGGING.
170°F
75°F
5'0"
PAVING INSULATED, COOLED BY INDUCED CURRENT OF ATMOSPHERE.
95°F.
SHAPED PLATFORM-BRACINGS TO REDUCE RISING CURRENTS AND CONVECTION LOSSES INDUCED BY VERTICAL FACE OF OUTER WALLS.
4½" EXTERIOR POROUS BRICK INSULATION
90°F.
6'0"
'DEMPSTER-TODGOOD' SYSTEM OF CONTINUOUS VERTICAL RETORTS.
ACTUAL SURFACE-TEMPERATURES OF A WORKING BED GIVEN.

Figure 3

KNOWN FACTORS IN METER VALUE

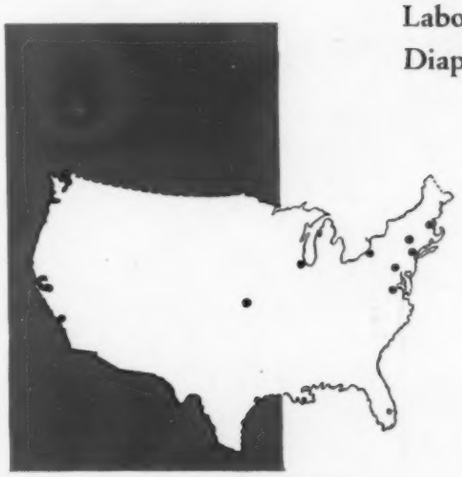
Gas Meters
for Domestic and Industrial Requirements
Manufactured or Natural Gas Operations

Meters for Demonstration, Demand, etc.

Meters for Large Volume Measurement

Laboratory, Experimental and Service Apparatus

Diaphragms and Maintenance Parts



American Meter Company

Incorporated

FACTORY AND SALES SERVICE

Factories:

AMERICAN METER COMPANY	*—105 West 40th Street*	—New York, N. Y.
AMERICAN METER COMPANY	*—Peoples Gas Bldg.*	—Chicago, Ill.
JOHN J. GRIFFIN & CO.	*—1513-21 Race Street*	—Philadelphia, Pa.
HELME & MCILHENNY	*—17th & Clearfield Sts.*	—Philadelphia, Pa.
MARYLAND METER WORKS	*—Holliday & Saratoga Sts.*	—Baltimore, Md.
D. MCDONALD & CO.	*—991 Broadway*	—Albany, N. Y.
METRIC METAL WORKS	*—10th & Payne Aves.*	—Erie, Pa.
NATHANIEL TUFTS METER WORKS	*—455 Commercial St.*	—Boston, Mass.
PACIFIC METER WORKS	*—495 Eleventh Street*	—San Francisco, Cal.
PACIFIC METER WORKS	*—2118 Atlantic Street*	—Los Angeles, Cal.

WAREHOUSE AND SALES SERVICE

Offices:

AMERICAN METER COMPANY	*—216 Dwight Bldg.*	—Kansas City, Mo.
AMERICAN METER COMPANY	*—422 Oliver Bldg.*	—Pittsburgh, Pa.

A Full Measure of Known Factors

Every factory of American Meter Company Possesses in Full Measure the Modern Manuf
in Gas Meter Economy—Economy of Quality, in Prompt and Careful Delivery,

MANUFACTURING FACILITIES

Strategic Location, Up-to-Date Equipment, Departmentalized Specilization, Ample Resources and Facilities for Research and Expansion.

Total Property Area—12 Acres. Manufacturing Floor Space—600,000 Sq. Ft.

SKILLED WORKMANSHIP

From the operation of Meter Repair Shops, Gas Companies appreciate the major importance of experienced personnel.

Skilled and *trained* workmanship is paramount in the Manufacture of Gas Meters. Thirty-five per cent of the well taught and cohesive force that constitutes American Meter Company manpower has a record of more than 10 years of gas meter specialization with this company.

AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET

Leadership Assets in Meter Value

acturing and Service Assets that are so Essential in Giving Gas Companies a Maximum
f Easy Installation, Accurate Service and Low Cost Maintenance.

EXPERIENCE AND PROGRESSIVE POLICY

Through pioneer research and experimentation American Meter Company has blazed new trails in efficient and economical performance, yielding the best efforts of its engineers and research laboratories toward the advancement of industrial practice.

Today—the factories represented above receive from their customers that complete confidence which a long record of unfailing reliability alone can give.

AMERICAN METER COMPANY

Incorporated

The World's Largest Manufacturers of Gas Meters and Allied Apparatus

ESTABLISHED 1836

LIST OF PRODUCTS

American Meter Company

INCORPORATED

METERS, DOMESTIC AND INDUSTRIAL SERVICE

Meters, A Type (*Tinned Steel Case*)
" B Type (*Tinned Steel Case*)
" C Type (*Tinned Steel Case*)
" Prepayment (*Tinned Steel Case*)
" Metric Iron Case (*Low, Medium & High Pressures*)
" Metric Iron Case Prepayment

METERS, DEMONSTRATION (Tinned Steel Case and Metric Iron Case)

Meters, Glazed Exhibition

METER DEMAND DEVICES

Empire Limiting Demand
Indicating Demand
Recording Demand
Maryland Demand

METERS, LARGE VOLUME MEASUREMENT

Meters, Linderman Orifice
" Westcott Orifice
" Wet Station

METER MAINTENANCE AND ACCESSORIES

Meter Connections
" Diaphragms
" Repair Parts

APPARATUS, LABORATORY AND EXPERIMENTAL

Calorimeter, American
Cubic Foot Bottles
Gassing Machines
Gasometers
Gauges, New Improved American Siphon
" Standard Siphon or "U"
" Superintendent's Pocket

Governors, Double Dry
" Laboratory Dry
" Wet Calorimeter
" Pressure
Meter Provers
Meter Testers, Hydro-Pneumatic
Meters, Wet Test 1/10 cu. ft.
" " " 1/20 cu. ft.
" " " Large Capacity (5-80 to 100-1200 cu. ft.)
Specific Gravity Apparatus, Schilling
" " " Bureau of Standards
Stop Clock
Stop Watch
Sulphur and Ammonia Test, Referee's
" " " " Young's
" " " " (H_2S) Chimney Type
Thermometers, Calorimeter
" Condenser
" Meter Prover
" Wet Test Meter

APPARATUS, SERVICE

Filters, Denver Gas
" R. G. T.
Furnaces, Gas Soldering
Gauges (*see Apparatus Laboratory*)
Index, Demonstrating
Meters, Critical Flow Prover, for H.P. Field Testing
" Demonstration
" Portable Test 20 cu. ft.
" " " 85 cu. ft.
" " " 5 and 10 Lt.
Thermometers (*see Apparatus Laboratory*)

SERVICE CLEANERS

Drip Pumps
New American Service Pump
Providence Vacuum Tank

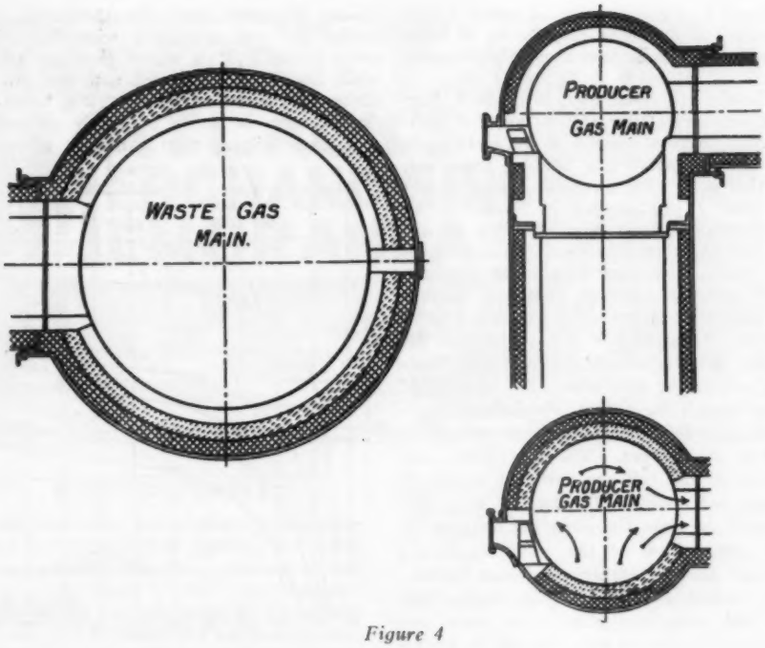


Figure 4

reducing the effect of radiation on the gas off-take pipes, and also minimizes trouble with condensates. Insulating bricks are advantageously placed on the top of the setting, one course below the top course, and covering them with ordinary brick. This enables the top to be more effectively grouted in when necessary.

A test was made in insulating waste gas and producer gas mains with six inches of firebrick lining and no insulation as well as with three inches of a porous diatomaceous earth insulating brick and three inches of firebrick lining. The temperature at the outside of the main was 360 degrees F in the first case and 157 degrees F in the second case. It has been estimated that a drop in temperature of 50 degrees F in the producer gas main will correspond to a loss of one percent of fuel put into the producer.

The following conclusions were reached from this study. First, considerable fuel value is lost by way of the walls of gas-making apparatus. This loss increases considerably with the use of higher combustion chamber temperatures. The loss of heat by way of the metal work of a setting is surprisingly high. A preconceived disposition of insulating materails based on an appreciation of their properties, the behaviour of the refractory in the setting and the peculiarities and functions of the plant is very desirable. Insulation as an after-thought requires very careful consideration. The thermal advantages of insulation vary with many circumstances, but are appreciable in many cases. The use of large, tongued and grooved insulating slabs is recommended in the place of bricks of normal size. In this way the heat losses by radiation through opened joint, or by conduction through jointing cement, will be diminished. When the design involves external insulation, there are strong arguments for building-in the insulating brickwork after the setting has attained working temperatures.—*Abstracted from the report of the Refractory Materials Joint Research Committee, presented at the annual Meeting of the Institution of Gas Engineers, June 1928.*

TEMPERING FURNACES FIRED BY GAS

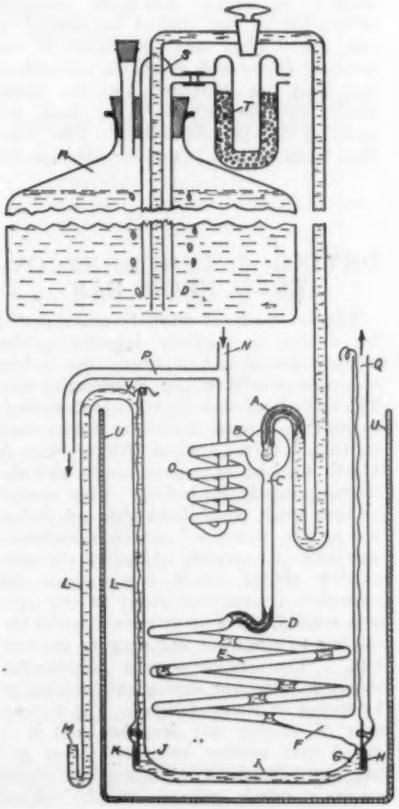
Gas is very well suited for use as a fuel in tunnel furnaces which are used for tempering castings. This type of oven was formerly fired with oil fuel. The great consumption of fuel on the one hand and the injury caused the walls of the furnace by the hot oil flames on the other hand made it desirable to change the method of operating the furnace. Tests were accordingly made with gas-fired furnaces.

The consumption of fuel for the production of gas required to heat a tunnel furnace which handles 46 tons of castings within a twenty-four hour period was 18.6 percent. The coke consumption was increased from as much as 20 to a maximum of 23 percent in the case where the weight of castings treated was smaller. The containers in which the castings were placed prior to being processed in the tunnel furnace lasted from four to five times as long in the furnace which is heated with gas as compared with the one that is heated with oil fuel. This condition is due to the fact that it is possible to maintain a netural atmosphere in the furnace with a greater degree of certainty, when gas is employed as a fuel. The uniform distribution of the temperature within the gas fired furnace is also advantageous. — *Revue de Fonderie Moderne, volume 22, pages 7 to 13.*

APPARATUS FOR CONTINUOUS GAS ANALYSIS

The apparatus, which is employed in determining a given constituent in a flowing gas mixture and registering automatically the concentration by electrical means, is shown in the accompanying illustration.

From a large reservoir R the absorbent is fed slowly through a tube terminating in a small bore capillary A^1 of 7 mm. outside diameter, whose flat, fine-edged tip is horizontally disposed. The rate



of flow is maintained fairly constant by means of the constant level device S, so that the liquid falls from the tip of the capillary in drops of uniform volume at intervals of about eight seconds. Each drops falls freely through the bulb B upon the aperture C, forming a thick film which traps the gas in the tube CD, of about 4 mm. bore, and forces it along in descending by gravity to the gooseneck at D. The latter is a capillary constriction of about 1.5 mm. bore, suitably bent so as to arrest each droplet until it is displaced by the impact of the succeeding drop. From this it results that the same

volume of gas, namely, the volume of the tube between the points G and D, is aspirated by each drop of the liquid.

The temperature is kept constant by immersion in a thermostatic bath contained in the receptacle U, so that the quantity of gas in each sample is assumed to vary only with the barometric pressure. The gas is introduced at N at a rate slightly in excess of that at which it is being drawn through the coil O by the pump action, the overflow escaping through the side arm P of sufficient length to prevent air from entering the coil. All of these tubes should be of sufficient bore to afford an easy flow of gas.

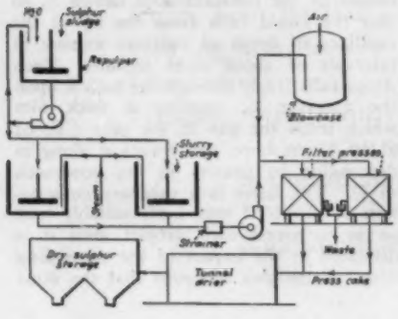
After having been thus brought into contact in a definite proportion by volume, the liquid and the gas traverse the coiled tube E, which should be long enough to insure practically complete absorption of the desired constituent of the gas. They are separated at the widened lower end F of the coil, where the films are disrupted and the liquid flows into the cell GIJ, the spent gas escaping through the tube Q. The overflow from the cell passes out through the siphon L, the outer arm of which is bent upward at its lower end, the tip M being level with a point just above the electrode H.

In the cell illustrated, the tube I, having an internal diameter of about 2 millimeters, is bent upward at the ends so as to prevent small gas bubbles from collecting in it. The electrode compartments G and J are similar in shape to an oblique cone, and the electrodes H and K are disks of platinized platinum, each of which is welded to a stout platinum wire about one inch in length. A portion of this wire is imbedded in a glass knob sealed to the wall of the vessel and the upper end is attached to a finer wire leading out of the apparatus. The wire leading through the siphon tube L is of platinum and requires a gas tight seal at V where it emerges. The dimensions and shape of the cell are designed to afford rapid and complete flushing, so as to diminish the time lag attending changes in the composition of the solution.—*E. C White, Journal of the American Chemical Society, volume 50, 1928, pages 2148 to 2154.*

DRYING SULPHUR RECOVERED FROM GAS

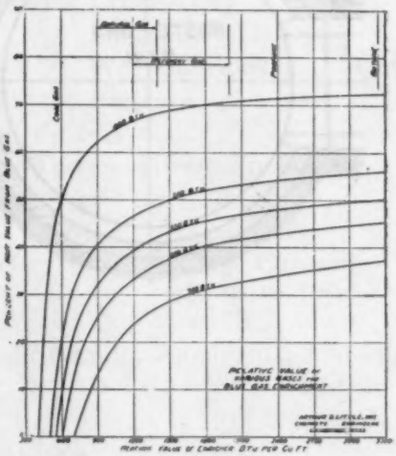
Various methods have been suggested for drying or partially dehydrating the sulphur sludge and so converting it into a proper condition for commercial use. The use of sulphur digesters is described, as well as various forms of driers. such as rotary driers, tunnel driers, etc. A fourth method of separation is also described, namely by boiling. This is said to have great possibilities although it has not as yet been tried out on a commercial scale. It consists in boiling the gray sulphur sludge, as it comes from the separator (containing about twenty percent solids), for a short time, causing the sulphur to coagulate and drop to the bottom. The accompanying illustration shows a plant for drying sulphur sludge by means of a tunnel dryer. The various uses of sulphur are described and it is stated that sulphur recovered from gas has reacted well to nearly every application in which ordinary sulphur can be used.

It is pointed out that sulphur, in addition to containing a very toxic material as an "impurity," has the added advantage of being made up of particles of almost colloidal size. The average size of the recovered sulphur particle is many times smaller than that of the smallest commercial brand of sulphur.—*K. N. Cundall, Chemical & Metallurgical Engineering, July, 1928, pages 407 to 411.*



ALTERNATE METHODS OF BLUE GAS ENRICHMENT

The problem of finding sufficient supplies of gas oil for the carburetion of water gas is discussed from the economic as well as the technical standpoint. The various possible materials which can be used for this purpose in addition to gas oil are discussed from the standpoint of availability and compared with that of gas oil itself. It is stated that gas oil, while not being threatened with the condition of emminent shortage, will nevertheless soon be more profitably treated at the oil refinery than it now is at the gas works. Enrichment with coal gas is also discussed and it is pointed out that its use for this purpose presupposes the location of a plant of considerable magnitude close to a market which can absorb coke, tar and ammonia as required.



Proper cooperation between oil refineries and gas works would be of benefit to both. The use of refinery gases in the place of gas oil for enriching purposes is suggested. The use of liquid butane depends largely on freight rates which are now too high to allow it to compete in certain sections of the country, as for example the northeastern States, but it ought to be attractive to certain scattered districts and to the gas oil markets of the Middle West.

The relative values of various enriching materials are given in the following tabulation.

Generator fuel at 25 cents per million B.T.U., efficiency 60 percent ($6 per ton for 12,000 B.T.U. coal or coke).

Heating value of finished gas. B.T.U.	400	500	600	800	1500
Using gas oil: Percent of heat from blue gas	68.6	50.0	37.5	21.9	0

Price of oil Cents per gallon	Cost per therm Cents	Cents	Cents	Cents	Cents
4	4.13	4.10	4.08	4.04	4.0
5	4.45	4.60	4.70	4.82	5.0
6	4.76	5.10	5.33	5.60	6.0
8	5.39	6.10	6.58	7.17	8.0
10				8.73	10.0

Compared with gas oil at six cents per gallon:

Gas	Heating value B.T.U.	Value per M. ft.	Value per therm Cents
Blue	300	$0.126	4.20
Coal	600	0.320	5.33
Coal	750	0.415	5.53
Natural	1000	0.571	5.71
Refinery	1200	0.698	5.82
Refinery	1500	0.900	6.00
Butane		6.67 cents per gallon	6.26

R. V. Kleinschmidt, Industrial and Engineering Chemistry, September 1928, 909-12.

WAFFLES FOREVER!

October sees the arrival of the appetite for crisp brown waffles, and while you may say, "there's no money in selling waffle irons," you must remember that if you can get folks to eat a little more food at home, you are helping keep intact that old domestic load which is so essential to the average gas company.

Another thing about selling waffle irons via the store demonstration method; you are stopping folks long enough to show them the advantages of gas for laundry drying, incineration, house heating, cooking or water heating and giving them an opportunity to examine first hand the appliances you pay good hard money to salesmen to go out and tell them about.

If the sale and demonstration of small appliances does not pay why do you suppose so many of the progressive merchandisers continue it—surely not merely to smell the food.

SPARKS FROM THE DISPLAY MAN'S HAMMER

During the last week we have heard no less than four men bring up the subject of better display windows and displays on the sales floor.

These men all stressed the importance of the utility store being more like a merchandising mart and less like an office and of going in for modern window displays and store displays. "Built in windows," said one man, "are the only type to have to properly display merchandise. Set in fewer items. Change your windows more frequently. Get out of the tissue paper habit,—buy a few velours, and silks. Then take care of them; have them cleaned and you may use them time and time again, and over a year's period you will have spent no more for real drapes than you would have if you had purchased paper.

"It does seem strange that the gas man will shell-out from fifty to a hundred dollars on a 'special edition,' for the benefit of the strap hangers, put on by professional high-pressure salesmen and faint when it comes to spending twenty-five 'smackers' for a background or a bunch of velour to make his window display stand out.

"The dignified concern does not send out sales representatives in unshined, run down shoes, a soiled collar and a ragged or patched suit to meet the public; yet frequently, when the public enters this same concern's place of business, it finds it in an attire that is conducive to anything save the idea of a contact with an up-and-going outfit."

Amen, we're for bigger, better and brighter window display advertising and store display.

HITCH YOUR WAGON TO THE BLUE STAR

Of those who are still wondering "if this Blue Star movement amounts to anything," we wish to call attention to the following fine booklets, which have hitched their sales activities to the Blue Star; "Wise Men Finance Blue Star Comforts into Their Homes":—The Dayton Power and Light Company, "Gas Ranges that Make Cooking Easier":—Providence Gas Company, "Blue Star Homes"—Milwaukee Gas Light Company, "Jim Puts It Over," a story of the Blue Star Home by J. L. Laycock, published by the Beverly Realty and Investment Company, Inc., Chicago; to say nothing of what the "Sawyer Log," published by The W. H. Sawyer Lumber Company, Worcester, Mass. has done to boost the movement.

If any gas man doubts the intrinsic value of the Blue Star idea to the gas industry as a whole, and to the manufacturers of gas appliances, ask A. E. Higgins to unload that small trunk of evidence of what has been done so far, the next time he visits you.

A BIT OF GOOD ADVICE

Here is the best one page sales manual we have ever seen. It is not written by Jim Trainer, of Lamneck fame, although it comes from him.

HOW TO DEVELOP LAMNECK DRIER SALES PROFITABLY

"Though I may not be able to inform men more than they know,
Yet I may give them the occasion to consider."—Sir W. Temple.

The Basis Principles

1—Seek the facts—get the proof.

Avoid action or decision based on mere opinion. Be sure.

2—Know—teach—convince.

No one ever buys until convinced; conviction comes from understanding; understanding from teaching; you cannot teach unless YOU KNOW.

3—Get down to brass tacks.

Come to the point quickly; be specific; avoid generalizations.

4—Be enthusiastic.

Sustained, patient effort gets results. Keep everlastingly at it.

The Product

1—Fix its mission.

What does it do better—easier—faster—cheaper? What is it effect on time—space—materials—energy?

If you are selling units and talking down on dollars and cents this year maybe you have neglected to push the Newer appliances as you should. Analysis now will help recover in '29.

2—Know costs.

People want and do buy—that is a certainty. But they insist on maximum utility at a fair price. An analytic knowledge of costs answers the fair price question and, at the same time, points to the possible existence of poor purchasing; wasteful production; inefficient selling.

3—Give service.

Fix the following as an unalterable policy; The product must meet expectations; make good promptly. "He profits most, who serves best."

The Market

1—Determine demand—actual and probable; status of prospects—territorial, financial, occupational and social.

2—Concentrate.

Do not scatter your efforts.

3—Plan distribution.

Make it possible for prospects to buy quickly, easily and economically.

4—Be alert.

Don't worry about your competitor; letter make him worry about you.

Publicity

1—Get your message before your market.

To those who never heard of your product it does not exist.

2—Properly present your message.

Stress what your product will do—(for the other fellow)—rather than what it is.

3—Advertise scientifically.

Be sure that you reach the real potential buyer; be sure that you have the BEST method for doing so; tests will indicate the efficacy of the methods selected."

That is a good manual and should be in the hands of every gas appliance salesman. It would make a fine study program for a sales school, and those who will follow it out will undoubtedly be able to sell.

A COOPERATIVE PLAN

We have heard of a cooperative plan the other day that looks good to us.

T. W. Logan, Manager of the Illinois Gas Co., Lawrenceville is educating the dealers in his town to sell appliances by creating a market for them in the gas company office and referring the sale to

the dealers. Mr. Logan has a display of well known, Nationally advertised small appliances and uses inserts and leaflets to bring these appliances to the attention of gas users and in turn, when prospects are developed, and after the appliance has been demonstrated, the customer is referred to one of the several dealers who handle them.

This little plan is sure to foster favorable public opinion and build up dealer relations and the sale of the better class of appliances. It may well be considered the opening wedge for bigger and better appliance outlets.

RANGE TRADE-IN VALUE

Allowances for old stoves is an idea that gas men have used for many moons—and it is a productive one. This allowance is usually ten dollars flat for "Your old coal, wood, oil or gas range." Now it seems, from what we can gather in talking to various gas men, that the furniture man is going about trade-in-allowances in a different manner, and in some cities is cutting in on the gas man's sales.

These dealers say; "With the constant clamor for the new we have decided that the life of the gas range, in the average home, has become materially shortened. The depreciation, due to new designs, new methods of oven construction, new types of burner tops and new colors, has increased to such an extent that we now feel that, if we use "the modern method" to sell ranges, we will have no trouble at all in reaping a good range harvest in the way of replacement sales.

"At one time the life of a gas range was assumed to be anywhere from ten to fifteen years, and of course at the end of that time it's trade-in value would not average over ten dollars. Today, however, due to the factors mentioned above, the home manager may have a range but one or two years when she decides to get rid of it for one of more modern design or color.

"This tendency has caused us to consider "trade-in" at the time we build our price and to consider the demand for used or rebuilt ranges, with the result that we now place a higher depreciation on all ranges and in so doing at the same time work out a higher trade-in allowance. However we never appraise a range "sight unseen." When the customer has a range to trade-in one of our men visits his home and makes an appraisal, after carefully going over the range and considering what we may be able to do in the way of pricing it when we rebuild it, and what our chances are for resale. In other words we are working along the lines employed by automobile dealers. Unless 'trade-ins' can be quickly rebuilt at very small cost we junk them for old iron."

This problem is one that all gas companies have to contend with and it seems that they may profit by studying the methods of the house furnishing people.

COUPONS AND REPLY CARDS

Coupons and reply cards are coming into their own again. One of the most successful nation wide major appliance campaigns, in the gas industry is going over big via the coupon and return card plan. The manufacturer is using the coupon in his national advertising and the four piece dealer mailing campaign uses

the return post card. You can bet for every person sending in a coupon or returning a post card there are three others who intended to, hence you may count four prospects for every return. But, it's up to you to see that you salesmen follow up every one circularized.

It's just another matter of follow through,—the little thing that causes so many mediocre ideas to produce or, if not done, causes so many good ideas to go goofy.

HERE'S A NATTY IDEA

Pop corn demonstrations sell lots of poppers and other things if your floor sales people are wide-awake. Free popped corn brings in many people and halts many who come into your store for other purposes. And the alert salesman will see that they view and learn something about the new heaters, ranges, incinerators, and other appliances while they are there.

A well versed salesman knows that, if he can get enough people into the store and talk to them, he will be well taken care of by the law of averages. For, he reasons, folks buy very few appliances that they do not know exist. To get the volume of appliance sales one must continually expose his wares to home managers.

A CRY IN THE NIGHT

Manufacturers frequently complain; "We do not get the support of the local salesmanager. We send our representative out and he plans a big sales campaign and we send the gas company a lot of expensive advertising matter, newspaper cuts or mats, window cards, store cards, inserts and folders and assign our man to assist in putting over the sale and, when results are reported and costs to us computed, we find that we lose."

Here is a place for the manufacturer and the gas man to apply a little study. When a sale is planned right and all the sales ammunition to make it click is at hand for use and is used and still the sale is a flop, it is certain that some one has not followed through.

We have heard that this is a pretty general complaint and while it would take many pages to set forth the many opinions regarding the subject, it is more or less the consensus of opinion that the plans are gotten up too hurriedly. Further, instead of sending a seasoned promotion man to cooperate with the local gas man the job is left to the sales representative.

"After all, how many salesmen are there who have the time and experience and inclination, if you will, not only to sell the dealer but to sell the customer?" asks one manufacturer's salesmanager.

That question may be the answer, who knows.

A FIRST CLASS AD

Speaking of advertisements that get the message over, jnst look at the one used recently by the Gas and Electric Shop. Here is an arresting head line, a timely text, with a modern twist that gets over "8 Good Reasons" why the 1928 home manager should be interested in what this shop has to say and offer.

Here is a story well told, an advertisement that should attract and interest women,—bring them in and put it up to salesmanship to get the order. We wonder if more advertising of this character, with this dignity, would not be more productive than the bold, black-typed bla-bla style we are all so familiar with?

8
GOOD REASONS
WHY WOMEN LEAVE HOME
ISN'T it quite true, generally, that where one finds the carefree housewife, one also sees the healthy, happy housewife?
All work and no play makes Mrs. Housewife tired and nervous. Every husband should realize the vital importance of providing the lady-of-his-home with sufficient conveniences that she may take time off to read, relax and enjoy.
The many modern electric and gas appliances all fit so appropriately into the scheme of things, bestowing gifts of freedom and of leisure hours. The formerly busy housewife now finds she may attend the bridge game, go shopping, or to the theater, happy in the knowledge that her day's housework has been completed and that the evening meal will be cooked automatically while she has "left home"
The Range
A choice of electric or gas is available in sizes and prices to suit every home and pocketbook. The Automatic Oven Heat Control does the cooking while you are away from home.
Vacuum Cleaner
The "electric broom" eliminates the drudgery of sweeping and rug beating. Easy to operate, the housewife can clean house every day in only a few minutes time.
Electric Ironer
Ironing is so much easier and convenient this new way. Instead of standing, one can sit down and manipulate this electric servant quickly and easily.
Laundry Dryer
No need to worry about rainy weather and poor wash days with this new gas appliance. The Lamack Laundry Dryer dries the clothes right in the cellar.
Automatic Housheating
Imagine the convenience of a furnace that requires attention only twice a year—and then only to light the gas or turn it off. It is regulated by a thermometer from any room of the house.
Electric Refrigeration
Healthful and dependable preservation of foods is assured with automatic Electric Refrigeration in the home . . . see the complete line of Frigidaires and Kelvinators now on display
Electric Washer
The drudgery of rubbing and scrubbing is so unnecessary now with the Electric Washer the entire work is done in surprisingly short order.
Automatic Water Heater
Always lots of clean, hot water on tap with an Automatic Water Heater . . . and those weary, wasted footsteps to the cellar are banished forever from the housewife's daily routine.
GAS AND ELECTRIC SHOP
DUQUESNE LIGHT CO.
224 FIFTH AVENUE
EQUITABLE GAS CO.
McKEESPORT, PA.

AN XMAS IDEA

With the coming of Christmas it seems it would be a mighty good idea for gas men to purchase for resale a number of miniature appliances that are on the market,—for gifts to the kiddies, if you will. What better educational material can you invest in? Miniature ranges, gas heated washers and ironers, cooking sets and tea sets will reach the kiddies and teach them something about the tasks of home management. As we view it, many special advertising plans of worth may be built around these miniature appliances. It certainly will not cost much to try.

CLERK OR SALESMAN?

"Department stores and chain organizations," says a manufacturer's representative, "have worked out an on-and-off duty schedule for their sales forces that keeps them standng before the customer and therefore when the sales person is on duty he is alert. Now why is it that so many utility companies furnish soft seats for their sales people and provide them with no rest periods and yet expect them to ever be up and greeting folks as they enter the store?"

We do not know. Do you?

Maybe they have to do a lot of detail clerical work that makes it necessary for them to be seated a larger part of the time. Maybe they are more of the clerk than sales person.

Study the duties imposed upon the girl or man on your floor and figure out whether or not it would be more profitable for him to be on his feet.

RAISON D'ETRE

These little ideas are given to you, not with the thought that you can or will want to use them all, but for the sole purpose of helping you when the old idea tank becomes dry; to give you a plan to put into operation when the "boss" asks "How's Business," and you know he has been studying the sales report They come to you for what you can make out of them.

A man, up around Chicago, who we think is one of the best in the merchandising business said this to us in a letter the other day: "The men who are keeping up sales today are the men who are constantly on the look-out for modern ideas in merchandising. None of us have a corner on ideas, yet there are a number of men whose ideas we always welcome."

An eight suite apartment house. Insulated walls and roof. High load factor business for the gas company. Economical for owner because of labor and space saved.

Some Economic Aspects of Gas Heating for Large Buildings

By Thomson King
Vice-president, The Peerless Heater Company

BY THE TERM "large buildings" in this article we mean to include all buildings of a public or commercial nature where the heating requirements are on a larger scale than those encountered in residence heating.

The economic aspects which we desire to analyze and discuss naturally divide themselves into two classes—Those that are important from the viewpoint of the company supplying the gas and those that are of particular interest to the consumer of the gas, that is, the owners or tenants of the buildings.

The general public of most communities has not yet grasped the significance of gas heating from central units, and even where a consciousness of its scope and destiny is beginning to dawn on the mind of the average man, he usually thinks of it as something on a small scale and very expensive. And too often even the gas man himself takes the same limited view of the scope of his own product.

This Utility Building in Memphis finds gas heat profitable.

If gas has possibilities for the heating of large commercial buildings and if these can be demonstrated and given publicity, it would go far toward placing gas heating before the average well informed man and imparting proper confidence and enthusiasm to the gas man himself. Therefore, a review of the subject and a consideration of its possibilities may prove interesting and worth while.

However, before taking up the study of whether and how we can obtain this class of heating load, it will be interesting to see what kind of a load it is from the viewpoint of the Gas Company. The heating requirements of a building are expressed in terms of Square Feet of Radiation, or of B.T.U. heat loss and one may be easily converted into the other. Since we have steam, vapor and hot water radiation and direct and indirect forms of each, all with different B.T.U. equivalents,

The twelve signs of the WELSBACH ZODIAC predict a fine winter *for Radiant Heaters*

ACCORDING to all the signs and sun spots and considering all phases of the moon, an unusually big season is about to open for Commercial Managers who feature Welsbach Radiant Gas Heaters. An increasing number of people are recognizing the enjoyable warmth, the cheerful comfort and the economy which gas heaters offer.

This year, opportunity knocks louder than ever before with three brand-new Welsbach numbers—"67", "69" and "71". New designs, new low prices and attractive finishes make these heaters a credit to any show room. Moreover, each one is equipped with the patented Welsbach "Million Dollar" Burner; each has the special choke, flue connection and all the rest of the exclusive Welsbach features which assure perfect operation under all conditions.

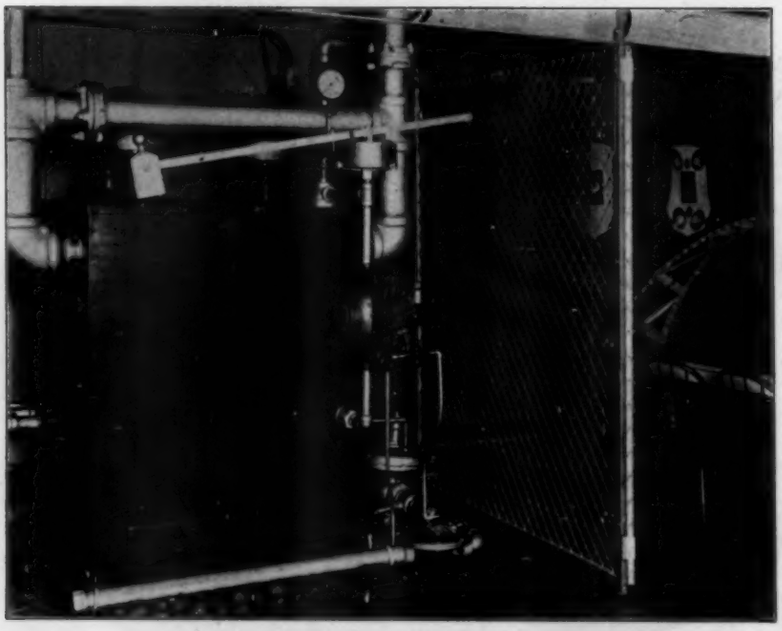
These three latest numbers round out the Welsbach line. They enable commercial managers everywhere to profitably meet the constant demand for an attractive, dependable gas heater at a reasonable price.

Welsbach Radiant Heaters will enable you to welcome cold weather. But please be reminded that winter is just around the corner. Better cover yourself with an order now. For complete information address Welsbach Company, Gloucester City, N. J.

Member of American Gas Association

Welsbach

RADIANT HEATERS



With a gas fired heater, the basement was used for other purposes

it must be understood that in this article a sq. ft. of radiation will mean the standard cast iron direct radiator which with 2 lbs. steam inside will dissipate 240 B.T.U. per hour when surrounded by still air at 70° F. Heat loss requires less definition as it is simply the B.T.U. loss per hour from a given building when subjected to the minimum temperature and the most severe wind condition which we may reasonably expect in its location.

This loss depends upon its construction, exposure, glass area and air tightness and may be calculated with very satisfactory accuracy.

A Typical Calculation

The gas company will be very much interested in the ratio of demand to consumption, or load factor, as this is a measure of the cost of delivering gas, and it may be well to give some average figures that wll indicate what may be expected.

Let us take the case of the Utility Building in Memphis. This will have a heat loss of 1,440,000 B.T.U. per hour and the installed radiation load will be 6,000 sq. ft. of standard steam radiation.

If the schedule recommended by the American Gas Association is followed, the boiler selected will have a heat delivery capacity 40% in excess of the maximum heat loss of the building, and if we assume an efficiency of 80% when operating at full rating, we can calculate the maximum hourly gas demand as follows:

Heat delivered by boiler = heat loss of building × 1.4 = 1,440,000 × 1.4 = 2,016,000 B.T.U. per hour.

$$\text{Heat input of the boiler} = \frac{2{,}016{,}000}{.8} =$$

2,520,000 B.T.U. per hour.

Assuming 540 B.T.U. gas the demand is 2,520,000 Divided by 540, or 4666 cu. ft. per hour; say 4660.

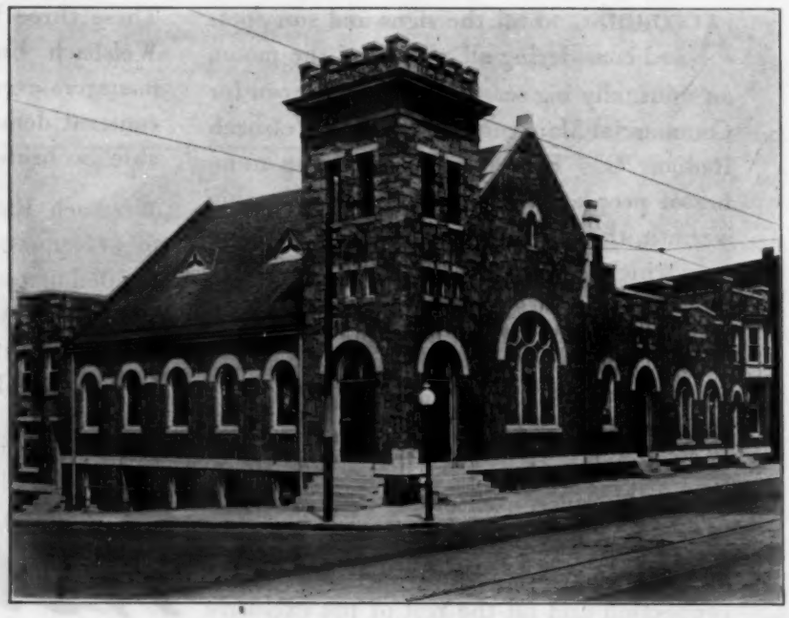
It may be remarked in passing that the schedule referred to and used in the foregoing calculation produces a boiler capacity which is probably somewhat larger than necessary in the majority of cases and that the demand could be substantially reduced by careful checking of the heat losses so that no allowance was needed as a factor of safety to take care of possible errors.

The consumption may next be determined and for the sake of illustraton, we may use an average figure of .15 cu. ft. of gas per degree day per cu. ft. of radiation per season. This figure is generally referred to as "K." The degree days may vary with the location from 1517 in Los Angeles to 9650 in Duluth, but taking 6000 as our average figure which would be representative for the latitude of Chicago, we find the season's gas consumption as 6,000 × 6,000 × .15 = 5,400,000 cu. ft.

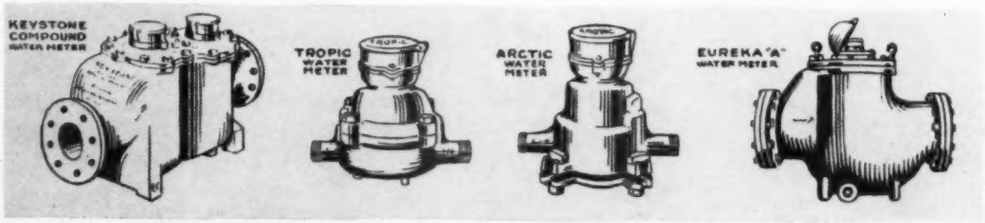
Annual Load Factor

To obtain the maximum day's consumption, we will assume that on the coldest day of the year we have a mean temperature for the twenty-four hours of 0°, or 65 degree days, hence the maximum day's consumption is 65 × 6,000 × .15 = 58,500 cu. ft. This is equivalent to the boilers burning at full rating for 12.6 hours on the maximum day. We can now calculate annual load factors for our Building. Annual Load Factor is the annual consumption divided by the consumption that would have occurred if the installation had operated at maximum demand for the entire year. But the load factor may be based on the maximum hour's demand or the maximum day's demand, or any other unit of time. The first of these units is of most significance when we consider investment and fixed charges on mains, services and meters, since their size is usually based upon the maximum hour. On the other hand, the plant investment is principally determined by the maximum day.

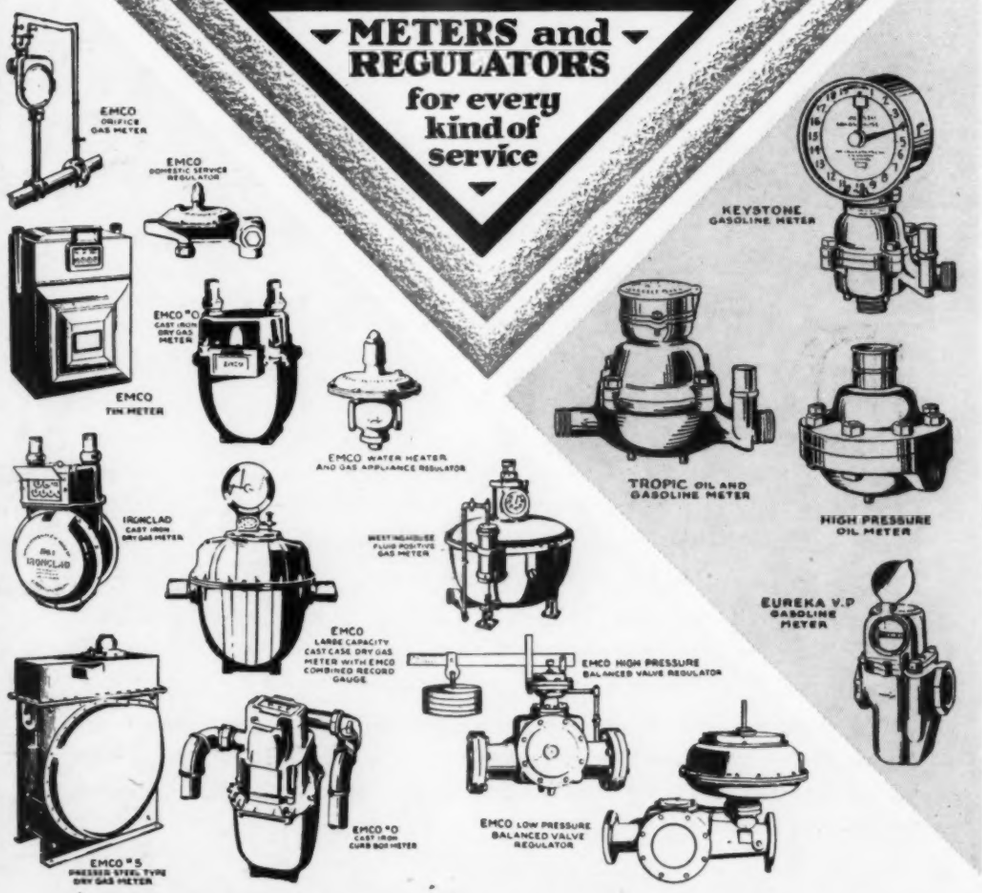
In the case we are using as an illustration the Load Factor on an hourly



This Church desired to use its basement for a Sunday School room so the fuel used had to be clean and safe



METERS and REGULATORS for every kind of service


EMCO ORIFICE GAS METER
EMCO DOMESTIC SERVICE REGULATOR
EMCO TIN METER
EMCO "O" CAST IRON DRY GAS METER
EMCO WATER HEATER AND GAS APPLIANCE REGULATOR
IRONCLAD CAST IRON DRY GAS METER
WESTINGHOUSE FLUID POSITIVE GAS METER
EMCO LARGE CAPACITY CAST CASE DRY GAS METER WITH EMCO COMBINED RECORD GAUGE
EMCO "S" PRESSED STEEL TYPE DRY GAS METER
EMCO "O" CAST IRON CURB BOX METER
EMCO HIGH PRESSURE BALANCED VALVE REGULATOR
EMCO LOW PRESSURE BALANCED VALVE REGULATOR
KEYSTONE GASOLINE METER
TROPIC OIL AND GASOLINE METER
HIGH PRESSURE OIL METER
EUREKA V.P GASOLINE METER

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS

PITTSBURGH, PA.

BRANCH OFFICES

NEW YORK CHICAGO COLUMBIA, S.C.

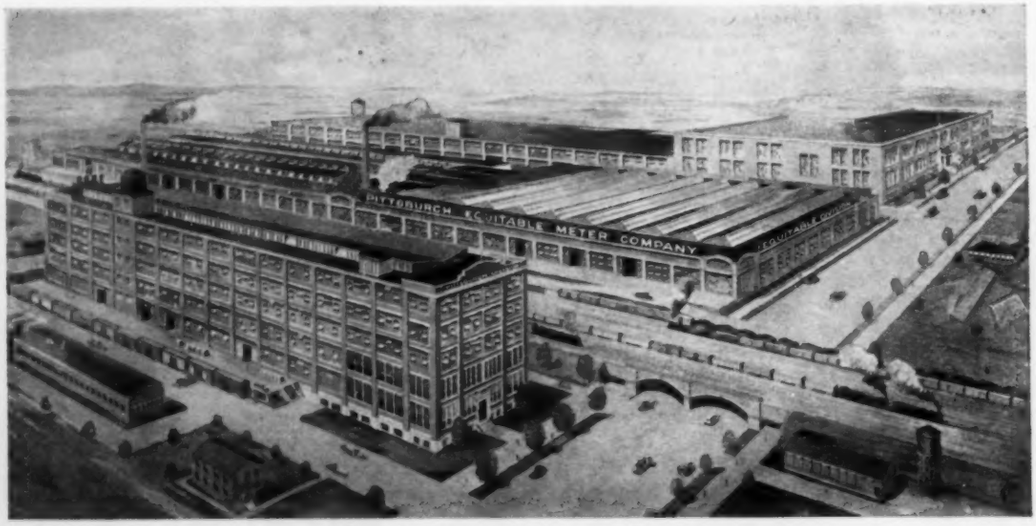
LOS ANGELES DALLAS TULSA

SALT LAKE CITY

KANSAS CITY

SEATTLE

ORMISTON-DOYLE COMPANY, PITTSBURGH



Factories and General Offices, Pittsburgh, Pa.

DURING the past two years in which the gas industry has had a normal growth, the Pittsburgh Equitable Meter Company has more than doubled its business. While this is a sign of the increased satisfaction with our product, instead of making us content with our progress, it has made us more anxious to serve the gas industry in every possible way.

We are devoting a large part of our income to scientific research work in our Chemical and Physical Laboratories and in our Engineering Department. We believe we have the best technical equipment for testing and developing better devices for gas measurement and gas pressure regulation.

Our resources are at the disposal of the gas industry. A number of new devices are in the process of perfection which will afford definite illustrations of progress in the branch of industrial science to which this company has devoted its efforts.

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS
PITTSBURGH, PA.

BRANCH OFFICES

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS
TULSA SEATTLE KANSAS CITY SALT LAKE CITY

basis is evidently $\frac{5,400,000}{24 \times 365 \times 4660} = 13.2\%$.

This means the Company secures a Consumption equal to 1155 hours use of the maximum demand per year.

On a daily basis our load factor will be $\frac{5,400,000}{365 \times 58,500} = 25.3\%$ or the equivalent of = 92.3 days use of the maximum day's demand.

Our first impression may be that these are rather low percentages and therefore indicate an undesirable load, but let us apply the same test to some other classes of the gas load. The domestic range is usually considered a very desirable appliance and the very backbone of the gas business. For the average range we may assume a maximum demand of 100 cu. ft. per hour and a consumption of 24,000 cu. ft. per year with a maximum day of say 400 cu. ft., then the Annual load factor on an hourly basis is $\frac{24,000}{100 \times 365 \times 24} =$ .028 or 2.8%. This is the equivalent of 240 hours use per year of the maximum hours demand.

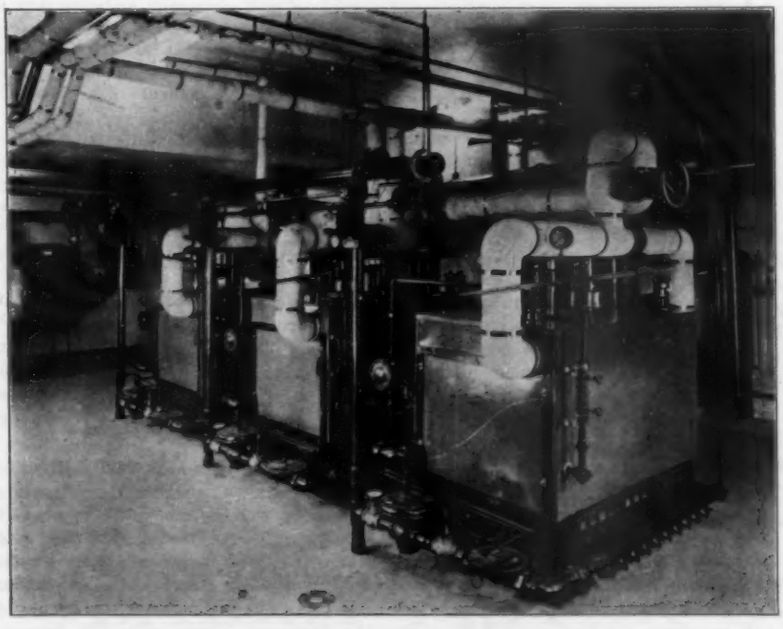
The load factor on the basis of maximum day is $\frac{24,000}{400 \times 365} = .16$ or 16%. This is equivalent to 60 days use per year of the maximum day.

It is evident that the heating of the business building gives us 4.7 times more consumption per cu. ft. of maximum hourly demand than the range and consequently 4.7 more gas sold per dollar invested in customer's meter and service than the range if the ratio of cost to meter and service capacity remained the same for the small meter and service necessary for the range and the large meter and service necessary for the boiler or furnace. As a matter of fact, the larger equipment costs proportionately less.

Compared with the residence heating load, the load factor of the average commercial building will be in most cases the lower, due to the fact that the building will be kept up to 70° ten to twelve hours per day, while the residence will require 70° for about fifteen hours per day. But this difference will vary with the nature of use of the buildings.

The apartment house and hotel will, of course, be exceptions to the statement of the preceding paragraph and will have a higher load factor than the residence, as 70° must be available practically eighteen hours per day. For the same reason because temperatures must be kept high enough to satisfy, the chilliest occupant, consumptions per ft. of radiation will run higher for such buildings than for the average residence and estimates must be made accordingly.

This bank needed more space for vaults in its basement, the solution was found in gas heat



The basement of the Metropolitan Utilities Building in Omaha demonstrates the cleanliness of gas heat

Diversity Must Be Considered

Besides load factor, we have diversity factor which is always important in determining the desirability of any class of business. We must remember that diversity between customers does not affect investment in meters or services which constitute quite a large proportion of gas company investment.

Diversity factor for heating installations is admittedly poor as all customers are affected by outside temperatures in the same way at the same time, and we can expect very little diversity between the maximum periods of consumptions of residence jobs except that which is due to the fact that some will begin to heat up their houses sooner than others and we may expect to have the greatest coincidence of consumption during the morning heating up period. We can, however, expect some diversity between residence heating and commercial heating because in general the residence heating up period will come

earlier than that of the commercial building.

There will also be a very satisfactory diversity between the maximum demand of the heating load and that of the cooking and industrial load since the maximum heating demand will come earlier in the day. What has just been said relative to diversity, of course, applies to hourly demand. When we consider the maximum daily demand, we can expect little or no diversity unless the coldest day of the year happened to fall on a Sunday or a holiday in which case the commercial load would not contribute as much as on a week-day.

Summary

To sum up the important points which it is the object of this article to emphasize and which we believe have not been sufficiently considered in studies of this subject for rate making purposes—

The hourly load factor of individual installations for heating commercial buildings is better than for the domestic range, and notwithstanding the fact that the heating load is active only seven months of the year, the sales of gas per dollar invested in mains, meters and services is several times as great as for the same equipment when serving the Range load. For residence and apartment heating the comparison is even more favorable.

Another not unimportant consideration is that commercial building heating is usually located down town and in most cases nearer to the gas work plant and therefore requires less main investment to reach it than the usual domestic load which is largely suburban.

From the Customer's Viewpoint

Passing to the viewpoint of the customer, we may expect that since commercial buildings are operated for profit he will only adopt gas heating when he can see a tangible saving in his operating costs and the arguments of cleanliness, convenience and luxury will not have the appeal that they have when he is considering it for his own home. Since the cost of manufactured gas will almost always be more than the bare cost of solid fuels, we must find and capitalize other costs and charge them against competing fuels. The most important of these are labor and rental value of basement space.

In the case of new buildings, it is very important that we present the claims of gas when the plans are being drawn, as often a large amount of money may be saved in the construction of the chimney and by eliminating the provisions necessary for getting in coal, storing it, and getting out ashes. Rental value may be added if it is known when the plans are being drawn that the basement will be free and clean.

The relative value of labor saving and reduction in construction costs will, of course, be greatest in the smaller buildings. For instance, if we can save one man at $80.00 per month for seven months on a building using 100 tons of coal per season, it is $5.60 per ton, but on a building using 300 tons per season it is comparatively insignificant. Likewise, if we can save $2,000.00 in the cost of the building and figure this at 10%, we have $2.00 per ton in the small building.

The deciding factor is often the rental value added by gas and I have known cases where this was great enough to compensate for the higher cost of gas withou other considerations.

The owner would in most cases like to use gas in his business building but he is afraid of the high cost, and he feels that since it is a business building he must decide on a cost basis. But cost may include many things, some of them unexpected and proposed by the owner. I recall a case where the thing that decided for gas for the heating of a store building was that the owner did not want anyone to enter the building on Sundays or holidays to attend to the coal fire for fear of theft of the valuable goods in the store. Care should be taken to ascertain any damage to goods or business done by coal or ashes. Where delicate goods are being handled this may be a deciding factor.

Safety and reliability must be stressed. Most owners know that the sections of a coal boiler may be cracked due to low water. How many of them realize that gas boilers are now protected against low water damage by an automatic device thus insuring against costly repairs and still more costly interruptions to business.

In general, the business building best suited for gas heating is one where it is not necessary to have a man around the building to look after other mechanical equipment. In such a building the use of coal means a man employed for at least the heating season, or if an outside man is depended on it means poor heating, and if the fire should go out on a cold Sunday or holiday it means in many cases severe damage by freezing.

We might go much further multiplying instances of indirect saving, each of which affects the economics of gas heating in business buildings, but we only wish to indicate the nature of the considerations that must be presented to the owner to secure such business for gas. The gas company representative must combine engineering ability and salesmanship and possess a high quality of each to secure this class of business, but there is a large amount of it which can be secured in every city where gas is available at reasonable rates and we believe that it represents a load that is sound and desirable.

Balancing The House Heating Load

By O. J. Kuenhold

President, The Scientific Heater Co.

THE gas industry in general is still groping in the dark with respect to the gas house-heating load. The prevailing ideas upon the subject are decidedly misty and for the most part erroneous. The impressions upon what the house-heating load curve now is or can be in the future are not clearly understood. Conclusions drawn from present experience are wrong because the industry does not realize how different the load curve of the future can be and will be.

The question of whether the industry can make house-heating with gas a profitable field has not yet been definitely settled because there is no generally understood and accepted plan upon how to economically handle the sharp high peaks of the extremely cold winter days.

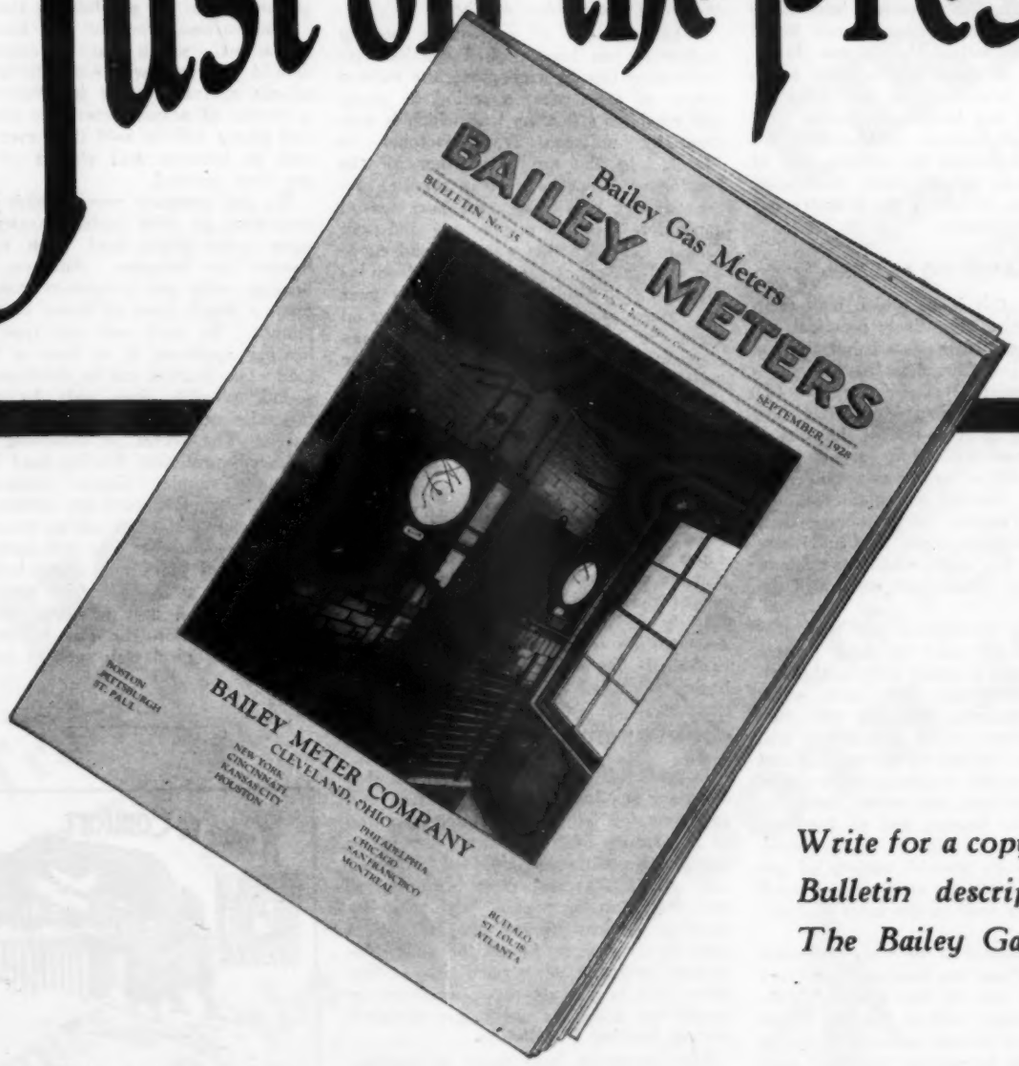
It is high time to take an inventory of the entire situation and get away from this blind groping. The purpose of this article is to give the industry a bird's eye view of this house-heating load—not the load of today, or the load most gas men have pictured in their minds, but the load which should be developed and which will constitute the load we will have ten or fifteen years hence. It is only with an understanding of what the house heating load will ultimately embrace that we can analyze experiences of today, weigh and compare their value, draw correct conclusions and lay out sound plans for the logical development of a profitable load curve.

The present picture which the industry has of the house heating load embraces central heaters only. Very little thought is given to related appliances. In fact some very important related appliances are either not known to the industry or they are ignored or condemned.

It is absolutely necessary that the gas house heating load be considered in connection with all the sub-loads and related loads. As a matter of fact, what we are after is not merely a house-heating load but a general gas heating load embracing:—

The heating of homes, both full season and part season; the heating of parts of homes as well as the entire homes; the heating of offices, stores, churches, lodge rooms, parts of factories, private garages and many other places where gas heating has particular advantages; the heating of the foregoing places with gas furnaces, boilers and space heaters of all kinds,

Just off the Press



Write for a copy of this Bulletin descriptive of The Bailey Gas Meter

This new bulletin just off the press points out the applications of meters for the measurement of coke oven gas, producer gas, petroleum gas, coal gas, water gas, natural gas, blast furnace gas, compressed air, oxygen, acetylene, hydrogen, etc. It describes and illustrates various types of indicating, recording and integrating meters, as well as pressure and temperature recorders which may be used as guides in the operation of gas producers, water gas sets, open hearth furnaces, soaking pits, heating ovens, blowers, compressors, ventilating equipment, etc.
The bulletin also contains a great amount of information on the use of orifices and flow nozzles for measuring the flow of gas and air. Orifice locations, meter connections and other important subjects pertaining to accurate flow measurement are covered in detail. A copy will be forwarded upon request.

See the Bailey Gas Meter in operation in Booth No. 127 at the American Gas Association Convention Atlantic City—October 8-12, 1928

BAILEY METER COMPANY

1051 IVANHOE RD., CLEVELAND, OHIO

or with conversion furnaces and boilers, or gas axiliary furnaces and boilers.

Now that we have fixed in our minds all that is embraced by the gas heating load we can proceed with its possible developments. We can now begin to consider something of supreme importance and of which we have previously heard nothing:—"Balancing the House Heating Load." In other words, how to so promote all branches and sub-classifications of the gas heating load that they compensate or balance one another, fill in to a large extent the valleys, and as we shall show, actualy bury those cold weather peaks of which the industry has been so apprehensive.

PLANNING SALES

To achieve this ideal, which may seem like a dream but is entirely practical, requires that we plan sales so that the gas heating load is balanced in three ways:—(1) Over every 24 hour period. (2) Throughout all districts of the territory. (3) From beginning to end of the season.

To balance over 24 hour periods it is necessary to fill in, as far as possible, the night valley. Garage heater sales should therefore be pushed hard because their load is essentially a night load and there is no limit to sales which persistent, year-after-year educational work will develop.

To balance throughout all your districts and mains, add to your present sales work on gas steam boilers, the following:—Promotional work upon warm air central heaters, auxiliary gas furnaces and boilers (to be attached to coal heating plants for use in spring, fall and the milder winter weather,) conversion burner installations, gas steam radiators, store and office heaters, and all kinds of space heaters. To sum it up,—promote the sale of every possible variety of gas heating appliances, the cheaper and small installations as well as the large and expensive ones.

The third balance is the most important of all,—to balance the heating load from beginning to end of the season. This "balance" demands radical changes in the ideas at present prevailing in the industry, and appliances heretofore regarded with disfavor must be recognized as of supreme importance to the gas heating program. To secure an evenly spread out heating load from October to March, the sale of the following appliances must be promoted:—

1—Gas furnaces and boilers auxiliary to present coal fired furnaces and boilers, for use in the milder weather when coal firing is most inconvenient, expensive and hard to control.

2—Easily removable burners installed in coal fired furnaces and boilers for use in spring, fall and moderately cold weather. (These can be made highly economical as will be explained).

3—Floor furnaces and other heaters in stores and the like, to be employed in spring, fall and mildly cold weather, when it is too much bother to start or fuss with the coal heating plant.

. There is no limit to the orders which can be secured. Gas has its biggest opportunity in part-season heating, because coal firing is most inefficient and troublesome in mild weather. The comparison of gas heating costs to coal is most favorable in the milder weather.

When the sale of part-season heating equipment has been pushed equally with full-season heating equipment, the natural course of sales after a period of years, will establish a heating load which is substantially uniform from October to March. In the milder weather all the heating appliances will be in service. As the weather gets colder the part season consumers drop off one by one and turn back to coal. In this way the load curve for part-season consumers goes down as the curve for full time consumers goes up. Many part time consumers hang on until the extreme cold weather peaks come on. The capacities of part time installations may be so gauged as to make it imperative that they turn to coal during the extreme peaks of the full time consumers load. In general, the laws of human nature automatically balance your heating load.

The foregoing has all been definitely proven in certain large natural gas cities. Their gas heating load comes on in fall, reaches a peak which is broadly spread out over average winter weather, recedes slightly in the extremely cold weather and subsides toward spring. Such a load can easily be handled upon a profitable basis.

CONVERSION JOBS ESSENTIAL

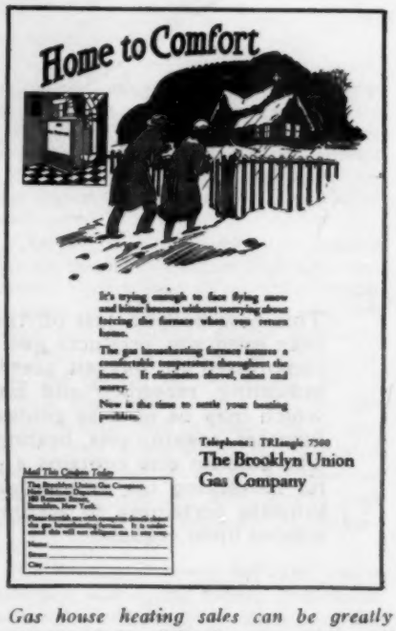
It cannot be emphasized too much that axuiliary gas furnaces and boilers as well as conversion jobs are absolutely essential to the future of gas heating, for in no other way can the heating load be spread over all districts and from beginning to end of the heating season. The prejudice existing against the above appliances must be overcome. When the above described program is carried into effect there will be six or seven auxiliary or conversion jobs for every gas designed central heating installation.

The enormous importance of conversion jobs to the future gas heating load has in the past been grossly underestimated. The fact that every one of the hundreds of thousands of oil burner installations in North America are conversion jobs has been overlooked. Where would the great oil burner industry be today, with its six hundred manufacturers and seven thousand dealers and distributors, had they been blind to the opportunities for sales offered by conversion installations.

Gas conversion jobs should be of two types:—those with easily removable burners, and those made for full season heating. Both types may be made highly economical by attaching to the coal heater an "economizer" which gives it the added heating surface and diving flue circulation which it needs to make it economical. Several such economizers are advertised in oil burner trade papers and have proven very satisfactory in operation. Some of them are arranged so that when coal is used they can be cut out of service, thus lending themselves to the part season heating which is of such supreme importance to the gas heating load curve.

The various types of gas heating installations which are recommended should not and will not interfere with all-gas central heating installations. As a matter of actual experience more central plants will be sold than ever before, and in sections and classes of homes not now reached.

No gas company would think of concentrating all their appliance sales efforts upon some single load, such as water heaters for instance. And yet in gas heating most gas companies concentrate upon a single class of house heating appliance. To push only one type of gas heating appliance is to have a lopsided load. Gas heating can be developed along sound, sensible lines only by pushing the sales of *all* classes of heating appliances. The secret of obtaining a well balanced, profitable heating load is after all quite simple. Simple because it is logical. Ample proofs are available that gas heating will work out as described if properly promoted. The only uncertainty is, how many years must elapse before the gas industry grasps the facts which have been presented and proceeds to systématically develop the gas heating program in a logical way such as has been outlined



Gas house heating sales can be greatly stimulated by following up with well directed and attractive newspaper ads. The above illustration shows how one gas company handles ntelligent advertising in this connection

HOMESTEAD FIRES

Truly appropriate Fireplace Heaters, ha
become such an important factor in space
heater sales, that you cannot afford to
miss the display of "Woodfires" and "Coal-
fires" at the ATLANTIC CITY CONVENTION

BOOTH 421

Association Activities

A. G. A. and affiliated gas associations' sectional activities and convention calendar

New Testing Laboratory Building Dedicated

The new Testing Laboratory of the American Gas Association was officially dedicated Sept. 13, when Oscar H. Fogg, President of the Association, unveiled a tablet which states that the building "is dedicated to promote and develop the gas industry to the end that it may serve to the fullest possible extent the best interests of the public."

J. G. Clark, engineer of research and training, The London Gas Light and Coke Co., London, England; R. W. Gallagher, President of The East Ohio Gas Co., Cleveland, Ohio; and Carl Shuler, director of law for the City of Cleveland, were the speakers at a special luncheon of more than 100 gas executives and officials held immediately after the unveiling ceremonies.

Col. Fogg's Remarks

In unveiling the tablet, Mr. Fogg said:

"The laboratory is in no sense a commercial enterprise. It is the tangible expression of the industry's allegiance to the principle that its greatest progress will be made through providing the best possible service to the American people.

"This structure, with its equipment, was initiated, erected, paid for, and sponsored by the organized gas industry of North America, made up of gas companies, manufacturer companies, and individuals."

In addressing the luncheon, Mr. Gallagher, who is chairman of the Laboratory Managing Committee, said, in part:

"Although a few who conceived the idea of a laboratory building had some conception of the possibilities that the laboratory held for the gas industry as a whole, I am rather doubtful whether two years ago any of us anticipated such possibilities as we have today.

"The staff has done wonderful work with limited facilities. That they functioned as well as they did and that they gave us results which were uniformly good, has brought about the possibilities of this larger and more efficient laboratory we have here today. I cannot say too much of R. M. Connor, the Laboratory director, and his staff of assistants."

Mr. Gallagher also said that since the Laboratory was started two and a half years ago, 258 water heaters, 281 furnaces and boilers, 838 space heaters, and 9500 stoves and ranges—a total of some 11,000 gas appliances—have been approved. Laboratory inspectors have travelled 25,000 miles.

"On 98 per cent of the appliances which have come to the Laboratory for inspection and tests, there have been some suggestions made which have benefited the appliances, and, of necessity, the manufacturers and the gas consuming public," Mr. Gallagher continued. "The mixed gas research work being conducted at the Laboratory is well under way. Some 30,000 tests have already been made."

Col. Fogg, President of the Association, made a brief address, and then called upon a member of the Association's Executive Board to make a motion that a tablet be prepared to include the names of the Managing Committee of the Laboratory. The motion was made and passed.

Utility Status

Carl Shuler, director of law of the City of Cleveland, in his address, complimented the gas industry on the beautiful and efficient building it had erected. He said that utilities of today are far different from those of 20 or more years ago.

"Now the utilities are attempting to work with their customers to give them a better service, a larger service, and at a cheaper price," he stated. "It is a

CONVENTION CALENDAR

OCTOBER

1-5 National Safety Committee, New York, N. Y.

8-12 American Gas Association, Annual meeting, Atlantic City, N. J. Alexander Forward, 420 Lexington Avenue, New York, N. Y., managing director.

8-12 American Society for Steel Treating, Tenth annual convention and National Metal Exposition at Philadelphia. W. H. Eisenman, secretary, 7016 Euclid Avenue, Cleveland, Ohio.

NOVEMBER

9-24 Second International Conference on Bituminous Coal, Carnegie Institute of Technology, Pittsburgh, Pa.

A. G. A. Laboratory Staff

Power Plant Practice In a Gas Burner

Why Not?

If it is necessary to control the air-fuel ratio in the boiler room, *why not* in the domestic heating plant? *The Automatic Roberts Gas Burner Unit* is the only atmospheric gas burner having the air-gas ratio controlled and directed *into the burner* to the points of combustion.

Special Radiants give
Highly Radiant Heat
not obtainable with other
materials

SAFETY
insured with the
Roberts Safety Pilot
in case of gas or electric
failure

PROVEN RECORD on Manufactured, Mixed & Natural Gases.

SEE BOOTH 202 A.G.A. CONVENTION

THE ROBERTS GAS BURNER CORPORATION

Jackson Building · 128 W. Chippewa St. · Buffalo, N. Y.

wise move. Thic laboratory is indicatve of that spirit in the gas industry."

J. G. Clark, the concluding speaker at the luncheon, said:

"It is well and often said that science has no frontiers and I always feel that the gas industry is an important branch of science and has no frontiers. In looking over the new building I was struck at once with the fact that your problems are similar to ours."

The new Laboratory building is a most completely equipped gas appliance and research laboratory, and is also the finest buildng dedicated to the testing of gas appliances in the world today, R. M. Conner, director, declared in a special interview.

New Laboratory Building

Testing Engineers Conducting Efficiency Test on Gas Fired Warm Air Furnace in the Central House Heating Section of the New Testing Laboratory Building of the American Gas Association Testing Laboratory, Cleveland, Ohio.

"The building provides roughly 3200 sq. ft. of office space, 8700 sq. ft. of storage space, and 14,700 sq. ft. for appliance testing and research," he said.

"The building is two-story brick, and was constructed by the Osborne Engineering Co., builders of the University of Michigan Stadium and the Yankee Stadium. Gas is used to heat the building.

"All of the appliance testing equipment installed is automatic, in so far as possible, to eliminate the personal equation in our determinations.

"We now serve more than 200 manufacturers, and for them we have provided three large rooms. These are completely equipped, and manufacturers may use them for their own work.

"It is interesting to note that more than two miles of pipe are installed in the building to provide gas, water and air to the various rooms.

"With the unqualified support of the entire industry, and the cooperation of the U. S. Bureaus of Mines and Standards and the Public Health Service, and other interested groups, we can expect much of the Testing Laboratory."

Pacific Coast Gas Convention

By Special Correspondent

THE thirty fifth Annual Convention of the Pacific Coast Gas Association opened Monday afternoon, September seventeenth, in the beautiful ballroom of the Hotel del Coronado, Coronado Beach, California with several hundred in attendance.

The delegates seemed inspired by the perfect, delightful weather and glorious surroundings. Reading before the meeting of tornadoes, storms and hurricanes in the middle West or Southeast, the beginning of the rainy season up North and cold elsewhere, all were impressed by the lovely flowers and sunshine in this, the jewel of Southern California.

These annual meetings, besides their technical value in various lines, are a great builder of good-fellowship and camaraderie. And who needs this more than the boys who are responsible for the sale of the product. Comparing notes, discussing intricacies, hearing of achievements away from home and from the beaten path, makes commercial men more alert, more humble and more determined to "do or die."

President L. M. Klauber's address was so interesting that it seemed shorter than it really was, and laid particular stress on a proposition to change from regional meetings of the geographical type, to section meetings of the conclave type.

With reference to the investigation now being carried forward at Washington, D. C. by the Federal Trade Commission, Mr. Klauber said that "certain news papers favorably disposed towards government ownership have reported the investigation in more or less distorted fashion in an endeavor to create a definite public antagonism toward utilities. Of course only a small section of the public absorbs this character of material without understanding that it is propaganda of the exact type that the newspapers which utilize it are the loudest in condemning. Nevertheless, we must face the fact that the results, however undeserved, are nevertheless present. Every industry, it would seem, should have the right to state its own case fairly and honestly over its own name. It should have the right to use every legitimate means of publicity to oppose attacks by biased advocates of socialized industry. Yet these propagandists would have us believe that their biased statements constitute beneficial public education, while any statement of our own side of the case is inherently improper and dishonest.

"After all, the best defense against this character of attack lies in our own construction of the much overused word "service." As long as we conscientiously

The New SPEE DEE BOILER

THIS new Spee-Dee Boiler embodies the first real improvement in range boiler design and efficacy since the range boiler became in use. It also embodies the biggest single advance in range boiler construction since the development of the gas water heater. It set a new record in water heating speed and does not radiate as much as an ordinary range boiler.

The Spee-Dee Boiler is so simple, so unique and so completely meets the long existing need for efficient method of hot water storage that you wonder why it had not been developed years ago. A sensational range boiler to demonstrate! Actually sells itself because of such obvious advantages.

In addition, the backing of a company of more than 23 years experience in the construction of gas water heaters, is a safeguard for the distributor's investment and a guarantee of the stability of his business.

The Spee-Dee Boiler is your opportunity for more water heater sales. Order one, get your customers' opinion and ask about our merchandising plan.

Booth 346, Young's Pier
A. G. A. Convention

© 1928 The Cleveland Heater Co.

THE CLEVELAND HEATER CO
1900 W. 112th St. Cleveland, Ohio

The

REX-PATROL AUTOMATIC WATER HEATER

UNPRECEDENTED consumer demand emphasizes the remarkable triumph of manufacturing and sales success of this wonderful new Automatic Tank Water Heater. Its amazing success is not confined to one city or state but reaches from coast to coast. It is universal.

To meet modern demand, a water heater must be dependable and efficient over and above its automatic principle. It should eliminate all possible work, but more so it must be safe.

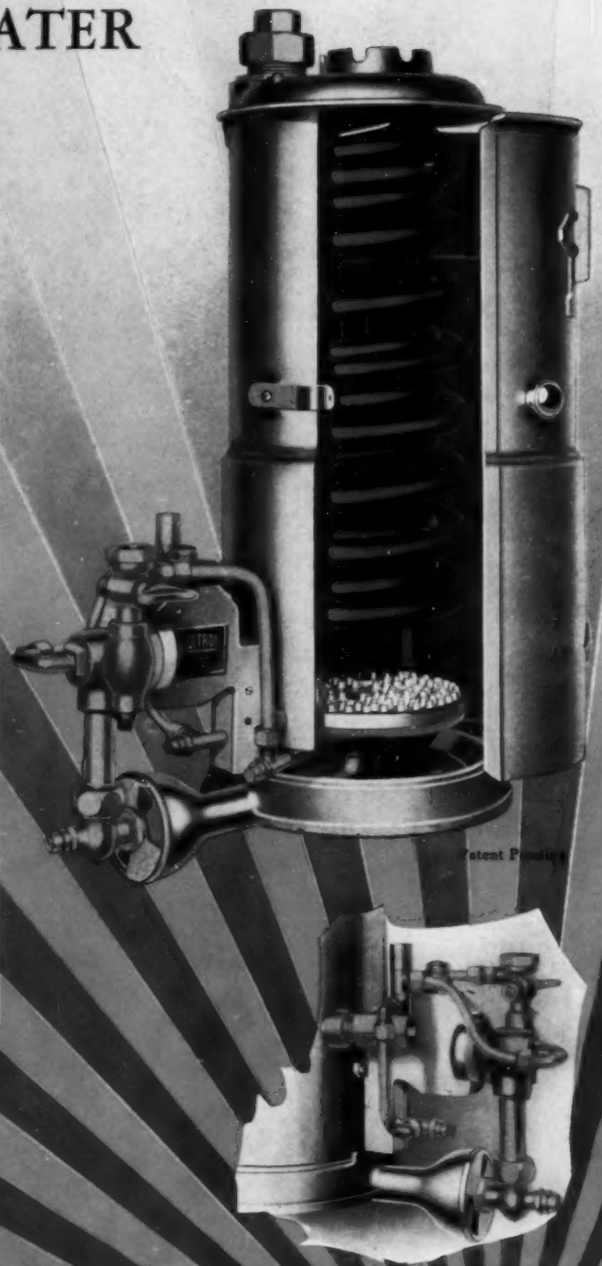
The Rex-Patrol Automatic Water Heater meets all these requirements in addition to the fact that it is the lowest priced automatic water heater on the market.

There's no need to tell you how much of an advantage it is to sell an automatic water heater. It is recognized that people do appreciate self-action hot water service. And, when in addition it combines numerous other valuable exclusive features, it is self-evident that the Rex-Patrol offers unusual opportunities.

Think of the sales possibilities of a water heater of this character. Write us today and let us tell you specifically what we will do for you as a Rex-Patrol Distributor to help you sell Rex-Patrol Automatic Water Heaters and increase your gas send out.

Booth 346, Young's Pier
A. G. A. Convention

© 1928 The Cleveland Heater Co.



THE CLEVELAND HEATER CO
1900 W. 112th St. Cleveland, Ohio

and sincerely try to render a character of service that is above criticism, so long will these attacks completely fail of their object. And we must render that service not grudgingly upon demand, nor sullenly following the pressure of insistent authority, but gladly and freely as something to which by every right the public is entitled. Service should always anticipate criticism."

Following Mr. Klauber's address, the annual election of officers was held.

Dickey Elected President

Charles H. Dickey of San Francisco was elected president for the forthcoming year. Mr. Dickey was formerly president of the American Meter Company, and is now vice president of the Southern Counties Gas Company of Los Angeles and a director of both the Pacific Lighting Corporation and the Pacific Gas & Electric Company of San Francisco.

Frank H. Bivens, vice president in charge of public relations and sales of the Southern Counties Gas Company was elected vice president, and D. C. Martin, auditor of the Pacific Gas & Electric Company of San Francisco, was re-elected treasurer.

Directors for a term of two years were elected as follows:

John Keillor, gas engineer of the British Columbia Electric Power & Gas Company, Ltd.

H. L. Masser, vice president and executive engineer of the Los Angeles Gas & Electric Corporation.

William Moeller, Jr., manager of natural gas production and transmission of the Southern California Gas Company.

W. M. Thompson, president of the Reliance Manufacturing Company.

L. M. Klauber, general superintendent of the San Diego Consolidated Gas & Electric Company, as the outgoing president, will also serve as a member of the board of directors for the coming year.

Other directors who will complete the last year of their terms are:

R. E. Fisher, vice president in charge of public relations and sales of the Pacific Gas & Electric Company.

N. R. McKee, purchasing agent of the Southern Counties Gas Company.

C. R. Miller, superintendent of utilization of the Portland Gas & Coke Company.

M. F. Wales, general agent of the Coast Counties Gas & Electric Company.

Growth in Membership

Clifford Johnstone, executive secretary, reported another increase in membership of ten percent, totalling now 955 members.

One of the speakers, representing the State of California gave some interesting figures on Natural Gas. The total production in 1927 was 275 Billion cubic feet, of which 72 Billion c. f. was actually distributed (34 Billion for residential and 38 Billion for industrial uses). As the total sales of gas in 1927 in California aggregated 95 Billion c. f. it shows how important a role the natural product played. About 23% of the production is for field use by the oil companies, the shrinkage is 15% and 20% is blown off or conserved.

L. M. KLAUBER,
Retiring President

In the evening the annual first-aid contest was given, competing for the F. J. Schafer trophy. The 5 men team of the L. A. Gas & Electric Corp. won. This company presented a novelty in the contest, namely, a girl's team, neatly uniformed.

Papers Pre-Printed

The following morning the convention divided into three sections, to art, accounting, commercial and technical. These three held meetings all day simultaneously in the spacious halls of the roomy Hotel del Coronado.

Most of the papers had been submitted in print beforehand, so that the author could call attention to the high lights and thus save valuable time for discussion by the delegates.

In viewing these sections in action, one thing was outstanding, namely the increasing prominence of the selling end of the business. As was well said: "The principal thing is to sell gas. Then the technical end will readily get together as to how best to produce it and the accounting end how to bill and collect for it. But unless it is sold, there's neither occasion for worrying about its production, nor its distribution or acounting:"

The commercial meetings were quite evidently the strongest magnets, drawing not only commercial men, but leaders from the other sections, some of whom attended these discussions and stayed away from their own.

C. R. Miller of Portland acted throughout as chairman of the Commercial Section Meetings.

E. M. de Remer of the Southern California Gas Company attributed the sluggishness of the Gas Industry to make rates that would secure industrial business to the weight of tradition.

"Gas has evolved through so many phases of service that we lose perspective. Gas was first used for street lighting, then for cooking, finally for house heating, storage water heating and similar operations. Only recently has it dawned upon us that industrial heating processes offer the biggest opportunity for load building."

Paper by Anderson

Kenneth B. Anderson of the same company had an interesting paper on the value of real service after installation was completed, one of the most essential things to sell things that won't come back to customers who will.

Herbert Haas' interesting contribution, was in his absence submitted by L. F. Galbraith of Oakland. Aside from its intricate details pertaining to "Increasing Gas Sales to Industry" it set forth why manufacturers of appliances are naturally less interested in the needs of the industrial division and Gas companies have in many instances, to come to the rescue in devising the desired appliances for the varied needs.

"Why Gas is Best for Restaurants" was interestingly worked out by I. L. Heckinger of the Pacific Gas & Electric Co.

J. Earl Jones of Portland Gas & Coke Co., submitted his committee's report on "What the Architect Wants," the main feature of which was the data recently produced by the American Gas Association and printed in very attractive form, to be added to by each utility as the local situation required.

L. J. Brundige had an intensely interesting, illustrated discussion on the tendency of domestic gas consumption to slump and possibilities of abating this trend.

The great importance of insulating houses and of weather-stripping was placed before the convention in a very thorough composition by Leo. Kroner, Heating Engineer of Portland Gas & Coke Co., showing in striking manner the saving in gas wastage by proper attention to keeping cold out and heat in.

Hartog a Booster

John H. Hartog of the same company told of his personal experiences along this line which had make him an enthusiastic booster for insulation. "Lower bills, more comfortable rooms, are a tremendous aid in enthusing the householder about Gas heating, even to such an extent that he affects all his friends and acquaintances in favor of our product," said Mr. Hartog. This paper, in Mr. Kroner's absence, was handled by Wm. Hoyt of the American Radiator Co.

A new note was struck when Chas. A. Meyer, president of the Los Angeles

Soap Co., took the stand and testified as to the value of the Gas Industry, of the enormous work the Soap industry had undertaken in preaching cleanliness. Cleanliness for looks, for joy, for health. Cleanliness by the use of soap and. . . hot water. And hot water. . .heated by Gas.

The splendid report of the Advisory Rate Committee as read by its chairman L. F. Galbraith of Oakland, electrified the audience and started something. The chairman of the meeting had a time to direct traffic along the line of the program's outline, so congested had this crossing become by the inrush of those who wanted to get across something. The warning of coming trouble for the gas manufacturers was sounded in no uncertain terms. The tremendous inroads of competition, not along one line now, but along several . . .each one formidable in its sweep.

The conclusion of it all was that companies should wake up, ere it was forever too late and concentrate on making such rates as would enable the sales departments to stop the onrushing waves from completely engulfing the splendid structure erected so painstakingly. Harold Basford of San Francisco advised calling in an experienced railroad rate engineer.

An Able Report

C. H. Potter of Los Angeles, the chairman-to-be of the Commercial Section, in an able report recommended meeting changed, new conditions with new weapons of attack. He closed by sounding an encouraging note, by adding:

"Remembering that the domestic load is the bulwark of our business we should not only fight to retain our threatened domestic load but strive to increase it. Your Committee on Retail Sales believes that it is not only possible to retain it but that increases can, in many instances, be shown."

Deep, technical discussions were started by intricate reports submitted by the chemical committee, of which Duncan Stewart was chairman, telling of the "Chemical Procedure in Gas Plant Laboratories" and Ted Rosebaugh's paper on the "Design of Scrubbing Systems."

The "Study of Internal Corrosion" by chemist Malcolm T. Burton was made more interesting by lantern slides illustrating the findings.

No one particular item can be selected from these voluminous reports, as none can be separated from their content and still be comprehensible; hence the papers have to be studied in full to get the benefit of their contents.

W. H. Henderson for so many years the valued secretary of the Pacific Coast Association, and now of Los Angeles, discussed the "Characteristics of the Domestic Load."

W. E. Robbins, auditor of the Southern California Gas company, presided over the meeting of the accountants, the papers and discussions covering many phases of both capital and operating account methods.

One of the most intricate creations in this section was that worked out by C. E. Niederer of Portland on "Barometers of Business Conditions."

Mr. Niederer said:—

"Ratios and graphs are to the business man what pressure gauges, thermometers, and other devices are to the engineer. They give warning or show where attention is required to maintain smooth and satisfactory operation. There are certain ratios and graphs which should be before the executive at all times just as certain pressure and temperature gauges should be before the operator.

Use of Graphs

"Gradually, as time progresses and conditions change through the increasing size of the business enterprises of the country, the need for a means of readily seeing the condition of a business is growing greater. Through the use of established ratios and graphs, this quick analysis is accomplished. Ratios are used to express relationships between different phases of a business and graphs are used to picture such relationships or to show the magnitude or trend of certain functions independently.

"There seems to be a tendency to look upon ratios and graphs as a secondary matter. Cost data are assembled and other statistics compiled, but too often the advantage of this data is lost because no definite use is made of the information. What is needed is some definite set of ratios and graphs that are prepared as regularly as the financial statement and with the same promptness."

A feature of the technical program was a description of the tremendous efforts being made by natural gas companies to prevent the waste of this precious California heritage. A. F. Bridge, vice-president in charge of operation for the Southern Counties Gas Company, and H. P. George, general superintendent of the Southern California Gas Company, told of experiments leading to the pumping of surplus natural gas from large producing fields into wells in other areas which had passed their producing period. The gas is stored in these fields and a part of it at least is available for future use.

Blue Star Home

Capt. A. E. Higgins, representing the American Gas Association of New York, defined the Blue Star Home as being one built on honesty of the best materials, and completely equipped with the most modern labor-saving devices for alleviating household drudgery. Capt. Higgins said no home could be called complete without modern automatic gas equipment, including a thermostatically controlled range, automatic waterheater, noiseless gas refrigerator, and the care-free gas furnace.

J. E. Pollard of Pacific Gas & Electric Co., submitted a really worth-while paper on "Relations with our Public through Executive Policies" a symposium of the papers submitted at the regional meetings. The quintessence of it was that as is the head, so are the members. Our contact with the public is mainly through the rank and file. The major executives are not the ones who create the good will. It's the employees, who come in touch with the consumer, it's they who build for weal or woe. Let the employees carry on the business, and let the head guide them, not telling them "Go" but "Come on!"

O. L. Moore of Los Angeles, Frank Bivens newly elected Vice-President of the Association and Wm. Baurhyte, ever-present ex-president all expressed themselves as heartily in favor of the resolution embodied in the Pollard report, to the effect that the necessity of attending the meetings and mingling with their assistants and other employees, should be brought close to the major executives, who have kept away from Conventions, with a few outstanding exceptions, thus depriving themselves completely of the viewpoint of their and other employees whose closer contact with the public give them an insight into the public viewpoint so valuable to the companies' policies.

As Mr. Bivens paraphrased it "The General Manager Keys the Symphony of the Organization."

Importance of Advertising

Mr. Moore averred that a man whose daily life it was to be in touch with the public was of inestimable value to the company, for there were plenty watching the interests of the company and someone should present the other, the consumers' interest.

In closing this particular discussion, Mr. Pollard accentuated the importance of continuous advertising vs. the unfortunate policy of some to only start advertising when they were attacked.

The first day of the sessions was a general meeting, at which the chairman of the four sections, Accounting, Commercial, Public Relations and Technical told of their endeavors for the past years and ambitions for the future.

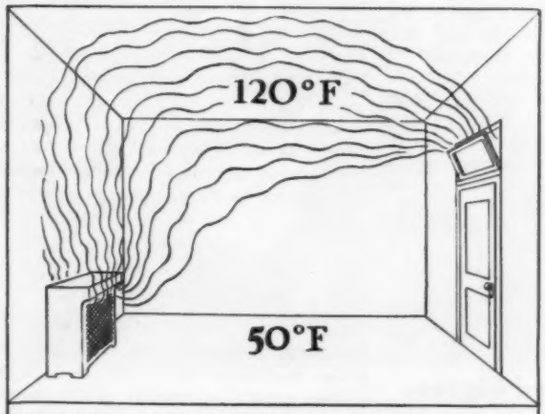
Throughout this convention there has been manifest a more than casual spirit of serious determination to combat the common enemy. While the optimistic views, like California's sunbeams, were more greedily applauded than the warnings of trouble and difficulty which might be compared with the early fog which overcasts the sun, yet as wise mariners the executives will do well to listen to the whistling buoy or lighthouse foghorn, alarming though it may sound.

A feature of the luncheons was the contest in three-minute speeches by representatives of various gas companies, selected by elimination. "Gas—the Aristocrat of Fuels"—and if Gas had ears, they would have tingled from all the nice things said about it.

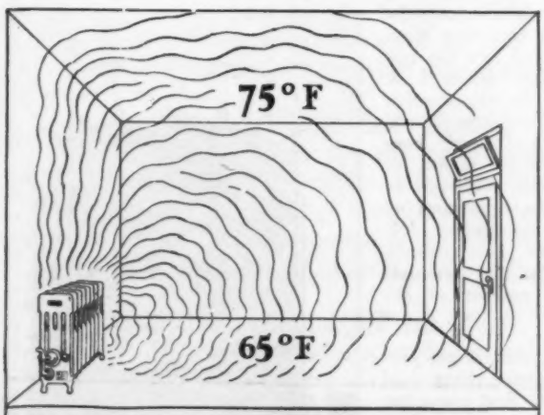
In the evening playlets were produced demonstrating the "Desirability of Gas in the Home" and at the last meeting of the Public Relation Section, a dialog was

but who lives on the ceiling?

Too often, heat just slides along the ceiling —*then exits by the transom!*



Straight up—then out the first exit—that's the action of heated air from high temperature units—and it means high cost.



Distributed evenly throughout the entire room—that's heat from Clow Gasteam Radiators—and it means low cost.

THE top illustration here shows how heated air travels from the usual high temperature heating unit—(heating air to temperatures as high as 300°F. as it leaves the appliance, because of inadequate heating surface.)

From it, the heated air rushes *up*—mostly *above* the living area of the room—then stratifies along the ceiling—usually ducking out at the nearest opening.

Not so with Clow Gasteam Radiators. Because their large low temperature heating surfaces are never hotter than low pressure steam, they distribute heat evenly throughout the room. And this heat warms the "living" section of the room as quickly as the ceiling.

Clow Gasteam Radiators are made of cast iron. They are built for long service. They are not hard to sell. And year by year, they mean satisfied gas users, warmer rooms and lower heating costs.

JAMES B. CLOW & SONS
201-299 North Talman Avenue, Chicago

CLOW GASTEAM

A. G. A. and Underwriters' Laboratories Approved

STOCKED IN EVERY SECTION OF THE COUNTRY

staged between two alleged stenographers, which in ten minutes demonstrated better the wisdom of educating the girl employees in the policies of their company than volumes of manuscript could have accomplished, one being an enthusiastic booster for her company, the other being new and devoid of all interest in her employer. The complete metamorphosis of the indifferent girl as accomplished through employee meetings was a lesson well worth meditating on.

The next Annual Convention is to be held at Del Monte, near San Francisco.

Mid-West Short Course in Meter Repairing, Distribution and Production

In December Iowa State College and the Mid-West Gas Association will put on a Short Course in Meter Repairing and General Gas Distribution and Production. This Course will be the eighth one.

The Course, this year,, runs from December 4th to 7th inclusive. The program will include, in addition to lectures, demonstrations and shop practice on meter repairing, the reading of papers on the following general topics in gas production and distribution:

The Mechanics of House Governors, Condensers,

House Heating Investments (This will cover the subject from the standpoint of what it costs us to take on peak loads of this nature)

The Effect of Bad Purification on the Distribution System,

Butane and its Relative Value to Gas Oil,

Blow Run and its Most Economical Percentage,

Pipe Corrosion and Protective Coatings,

Ground Temperatures Existing Around Gas Mains and How they vary from Season to Season.

The Metering of Industrial Gas and the Cost of Laying Mains. This last subject will treat it from the standpoint of whether or not power machinery is an advantage and under what conditions and limitations.

This comprehensive program compares very favorably with any program of its nature to be found in any section of the country.

R. L. Klar, Des Moines, Iowa, is chairman of the committee.

Natural Gas Production in 1927 Attains Record Figures

The history of the natural-gas industry in 1927 was similar to that of the petroleum industry, as a record output was marketed at reduced prices, states the United States Bureau of Mines, Department of Commerce. The total amount of natural gas produced and delivered to consumers in the United States in 1927 amounted to the huge total of 1,445,428,000,000 cubic feet, an increase over 1926 of 132,409,000,000 cubic feet, or 10 per cent. During the year 184,000,000 cubic feet of gas was piped to Canada and Mexico, which, when deducted from the total production, leaves 1,445,244,000,000 cubic feet as the total amount of natural gas consumed within the United States in 1927. The value of the gas per thousand cubic feet at the wells decreased from 9.5 cents in 1926 to 8.8 cents in 1927, and at points of consumption from 22.9 cents in 1926 to 22.0 cents in 1927.

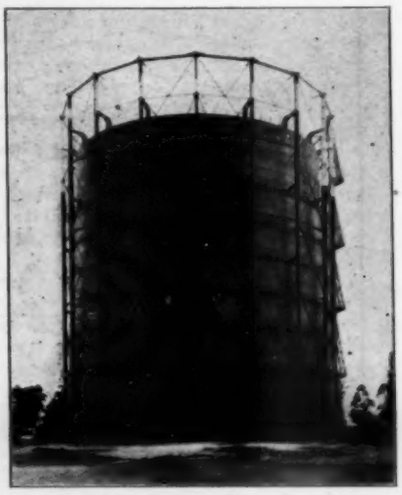
In 1927 there were 3,984,000 domestic consumers of natural gas in the United States, who used in that year a total of 296,036,000,000 cubic feet of natural gas. This represents an increase in the number of domestic consumers of 253,000 or per cent, but an increase in total consumption of only 2 per cent. The average consumption per domestic consumer was lower for the fifth successive year and in 1927 amounted to 74,300 cubic feet as compared with 77,500 cubic feet in 1926. This decrease in average consumption is probably the result of more efficient use. The average price paid for natural gas by domestic consumers in 1927 was 60.8 cents as compared with 58.4 cents in 1926. As an illustration of the steady increase in the price paid by domestic consumers for gas it may be cited that the 1927 price was very close to twice the 1917 price and that the last decrease in average price occurred in 1908. On the basis of the consumption and price data given above, the natural gas bill of the average domestic consumer in 1927 was $3.76 per month, or $45.17 for the year. Ohio continued to lead the States from the standpoint of number of domestic consumers, followed by California and Pennsylvania. Only two States, Indiana and Missouri reported a decrease in number of domestic consumers.

The order of the large natural gas producing States was materially changed in 1927. Oklahoma retained first place but Texas moved from fourth to second place and Louisiana from fifth to fourth, displacing West Virginia. Production in Oklahoma registered a 14 per cent gain in 1927, chiefly as the result of gas produced incidental to the intensive drilling for oil at Seminole. Texas, by virtue of a 45 per cent increase in output, made the best showing among the major gas-producing States.

The total consumption of natural gas by industrial users in 1927 amounted to 1,149,208,000,000 cubic feet an increase over 1926 of 12 per cent. This total was divided about equally between field use, that is, for drilling, pumping, etc., and for industrial uses, including gas burned in making carbon black and gas used by manufacturing establishments. Practically all of the increased consumption of gas for field purposes occurred in Oklahoma and Texas, as the result of an intensive drilling campaign in those States. The major portion of the increased consumption of gas for other industrial purposes occurred in Louisiana, where there was a noticeable increase in use as fuel by refiners, and in Texas where the consumption by carbon black manufacturers in the Panhandle district and by industrial plants in the Texas Gulf coast district showed material increases. In general, the price of gas for industrial purposes has shown little change over the past ten years, whereas, as noted above, the price of gas for domestic consumption has increased steadily. This is due mainly to the fact that the fields near the centers of population have declined in output, whereas all the prolific gas fields of recent years have been found in comparatively isolated localities.

Erect Holder in Brazil

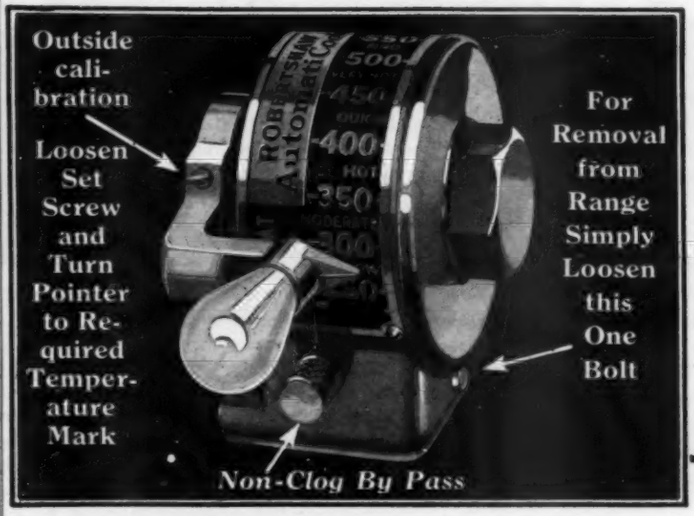
The Stacey Brothers Gas Construction Company, Cincinnati, Ohio, has just completed erection of one of its standard two million cubic foot capacity gas holders in the City of Sao Paulo, Brazil, for the Sao Paulo Gas Company.



It will be interesting to American Gas Engineers to know that Stacey Brothers took this contract against British and German competition. They have been highly complimented on their work by the Chief Engineer of the Gas Company.

Stacey Brothers now have holders in every state in the United States, as well as in Canada, Mexico, France, Panama, Colon and Brazil.

GAS COMPANIES and STOVE DEALERS



Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.

Youngwood, Penna.

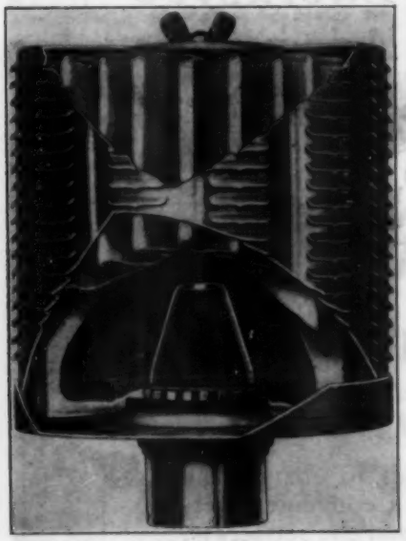
The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges

Equipment News

A New Air Filter

One place where many plants fall down is overlooking damage done to equipment by dirty air.

The air we breathe contains more than 100,000 particles of dust per cubic inch, according to estimate of the U. S. Weather Bureau. And the dust and grit with which air is saturated, as well as



the oil, water, rust and scale which is collected by air as it passes through pipe lines on its way to compressed air tools, paint sprays, compressed air equipment used in agitating liquids, ice-making, chemical processes, etc., are damaging elements which should be eliminated, for they cause clogged air passages, worn parts and carbon, and thus lower the operating efficiency of the apparatus, cause costly repairs, shut-downs and delays.

These difficulties can be largely overcome, by delivering clean dry air to air-using machinery and tools.

A new filter which can be easily inserted in the air lines has recently been placed upon the market. It is claimed that this air filter will remove dust, water, oil, rust, scale and other foreign matter from air passing through pipes and prevent wear and damage caused thereby.

This filter consists of an aluminum housing enclosed in a pressed steel housing, which manufacturers claim will withstand a working pressure of 125 lbs. The filter mounted inside consists of a felt filter medium formed in pockets over radial wire screen fins grouped around a central outlet. This permits mounting a relatively large area of felt in a compact space and allows the use of the entire available area of felt with a negligible restriction. The large capacity inserts are designed to pass 250 cu. ft. of free air per minute and contain 20 sq. ft. of felt within a volume slightly smaller than a cubic foot.

As air enters the top of these filters, it is thrown against the inner wall of steel housing by a shield over the top of filter. The downward velocity carries water, oil and most of the grit to the bottom of shell. All remaining water, oil, dust and grit is said to be caught by the filter. A drain cock is provided at the bottom to remove water, oil and sediment.

By closing a valve to shut off air going into the filter housing, and opening the drain cock, the air in the outlet pipes or hose is blown back through the filter proper, removing all material on the filter surface. Manufacturers claim that this filter can in this way be cleaned in about 10 minutes while in operation and that cleaning is necessary but twice a year under ordinary conditions. No oil drain or cleaning tanks are necessary, and the filter does not have to be removed when once in operation.

According to literature of the manufacturers, the Staynew Filter Corporation, Rochester, N. Y., a test made by the University of California using a standard dust, 98.6% of which will pass through a 200 mesh screen, gives the Protectomotor Filter a filtration efficiency of 99.9%.

The New Roots Meter Model SA

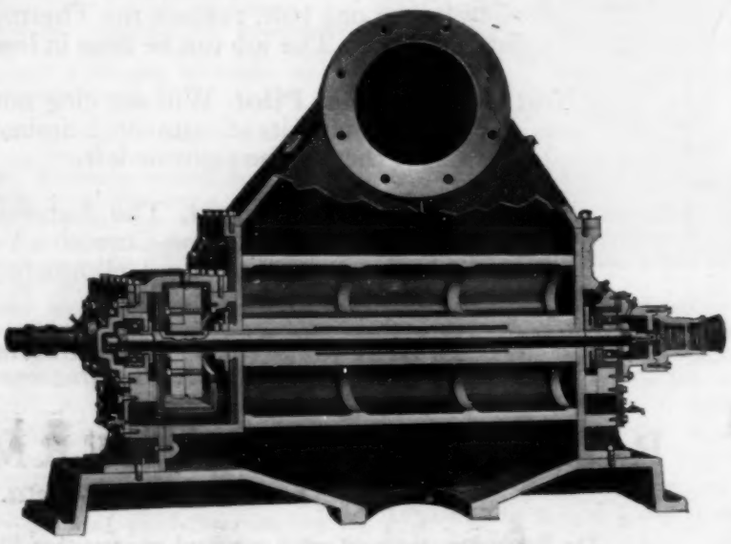
In addition to the itmportant improvements in mechanical design incorporated in the NEW ROOTS METER, desirable changes in operating characteristics have been accomplished. The reduction in running friction brought about by the improved volume integrator, timing gear set, bearing mounting and recording instrument drive, has not only reduced the amount of slippage present but has affected the relationship of this slippage quantity to the total volume measured .

This changed relationship it is claimed, practically eliminates the necessity of manual correction for slippage on the registered volume. The degree of accuracy obtained by the use of volume readings taken directly from the integrator is well above that universally accepted by the industry.

In order to meet diversified requirements, this metering equipment is built in a large number of sizes with hourly capacities ranging from 100 to 1,000,000 cubic feet per hour. These capacities are based on atmospheric displacement and may be increased by raising the pressure of the gas being metered and correcting the displaced volumes to standard temperature and pressure conditions.

To make these Meters thoroughly adaptable to present-day measurement needs, a complete line of recording instruments has been developed. Through standardization of these instruments it is now possible to interchange them on any Meter, regardless of the latter's size.

Two styles of the NEW ROOTS METER, the Standard Duty and Heavy Duty types, are offered. The first is for gas measurement where pressure requirements do not exceed 10 pounds per square



RAY-GLO

Designed for Profit!

THE Sheraton model Ray-Glo, shown below, is truly characteristic of Sheraton's beautiful design. His geometric construction and reserved design are brought out in pleasing bold relief.

Plated parts are of either Solid Brass or Solid Bronze while the construction has the exclusive Ray-Glo features.

SHERATON, No. 310

Designed for Profit

RAY-GLO Heaters go one step further than merely being designed along the conceptions of foremost homc-decorative authorities.

They are designed also to offer a profit to those who sell Ray-Glo Heaters and those who buy them.

So carefully has the problem of building a better heater been solved at the Ray-Glo plant that manufacturing and material costs are the lowest possible for utmost in quality workmanship and production. Those purchasing Ray-Glo heaters profit by receiving period models far in advance of current styles and the utmost economy in instant, clean, healthful home-heating. You will profit by selling Ray-Glo Heaters.

RAY-GLO RADIANT HEATERS

The

J.H.GRAYSON MFG.Co.

MAIN OFFICE & PLANT

ATHENS, OHIO

After January 1, 1929, our name will be

The Ray-Glo Corporation

inch. The Heavy Duty Meter is adapted for service where pressures up to and including 100 pounds per square inch are considered.

Each meter is equipped with a Roots Volume Integrator and a Roots Differential Gauge.

Additional information will be sent upon request to The P. H. & F. M. Roots Co., Connersville, Ind.

New Johnson Urn Burner

The new Johnson type of Urn Burner equipped with Thermostatic Control is an entirely new device being placed on the market.

These Controls are now in a perfected form, after months of testing, and have been approved by several Laboratories. The following claims are made:

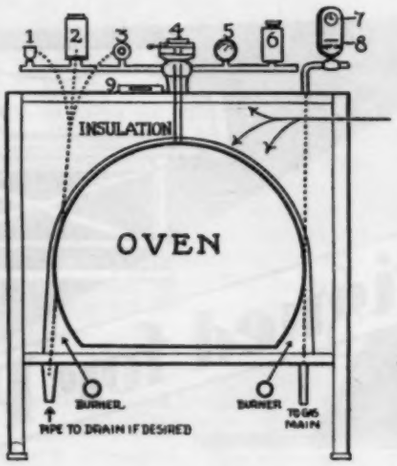
The Thermostat is entirely automatic and eliminates any possibility of boiling the coffee or the water in steam tables, and makes a great savings in gas consumption. The savings in gas consumption alone, on a single installation, pays for the complete unit in a very short time.

The Thermostat is very simple, entirely automatic, and will last indefinitely. The burner is also of an entirely new design, which gives very efficient results.

Additional information will be sent upon request to the manufacturers, Johnson Gas Appliance Co., Cedar Rapids, Iowa.

New Hotel and Restaurant Range

A new hotel and Restaurant device which cooks by saturated vapor and by radiant heat is being introduced to the gas industry by the Ko-Ray Corp., 110 S. Dearborn St., Chicago, Ill.



The Ko-Ray Hotel and Restaurant Range embraces principles heretofore unknown to the culinary profession—the results being an unprecedented retention of food flavors and values, and extraordinary emergency capacity—obviating excess advance preparation of food through quick operation. The Ko-Ray boils, bakes, brown or roasts.

The manufacturers point to the fact that there are no odors, no vapors, no smoke, no excessive heat.

Of interest to gas men, and still more so to hotel and restaurant men is the fact that the Ko-Ray is automatic in operation, yet responds to the chef's skill. The automatic feature is clearly described in the cross-section view herewith.

The Ko-Ray gets its results by first expelling air from the cooking oven, automatically keeping the steam or vapor at approximately 8 lbs. of pressure or at about 231 degrees F. temperature, and by applying the infra red heat rays (radiant heat) in a way to prevent condensation.

All cooking operations, it is stated, whether browning, baking, or frying, differ only in the amount of heat used, and in the length of time the food is subjected to heat.

Gas burners under the oven furnish the heat which is skillfully distributed and automatically regulated so that any degree of heat may be obtained.

Heavy insulation for the oven assures a temperature of 400 to 500 degrees in the inside, with the outside temperature—6" away—only 90 degrees.

It has been stated that the Ko-Ray is automatic in operation, assuring the proper cooking heat at all times, with great saving in fuel. But whether or not the time clock is set for a specified period, temperature regulation operates anyway. As soon as the oven has reached the maximum temperature needed for cooking the food which it contains, an automatic valve reduces the gas. Consequently the radiant heat in the oven carries on for the balance of the cooking period, without burning more fuel. If the temperature drops below that needed, the valve automatically opens again, and brings on the heat.

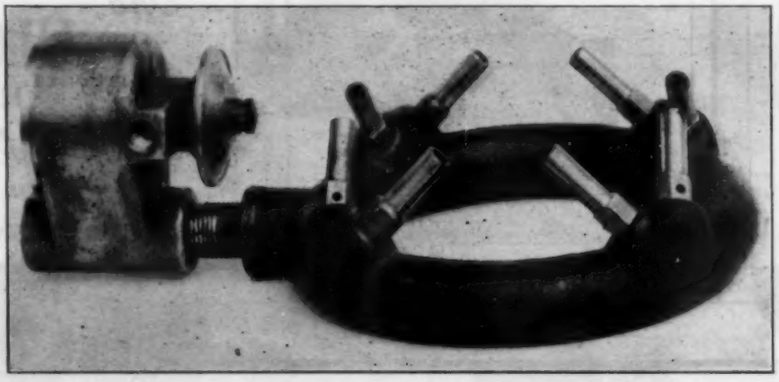
The amount of browning desired—as well as specific operations—is entirely in the hands of the operator, depending on how he opens the trickle valve to allow the escape of steam.

Spencer Klixon Safety Pilot

The Spencer Thermostat Company, Cambridge, Mass., have recently brought out their latest development by way of a Safety Pilot, which cannot be adjusted and is attached inside of the fire box on an automatic storage water heater.

There is no adjustment to this Safety Pilot, which contains no toggles, cams, or springs, it depending solely for its action on a disc. This disc, it is claimed, has been operated for over five million flexures without variation, the test extending over a period of four years.

A special composition, magnesium



Safety Pilot connected to Burner

FAMILY HIS INSPIRATION
Little Disc to Help Housewife
Electric Heat Control Device Invented by Man Who Got Idea in a Lumber Camp.
Boy's Toy Developed Into Thermostat Brings Inventor $1,000,000 Reward
HOME GREATEST SUCCESS, SAYS INVENTOR
INVENTOR LOVES FAMILY; VALUES WEALTH LITTLE
New Quick-Action Thermostat Perfected by Revere Inventor
OBSERVATION AS BOY BRINGS HIM MILLION
Million-Dollar Thermostat Devised by Revere Inventor
omen Will Invent,' Believes Father
n-Dollar Thermostat Brain Child

Spencer Thermostat Co. PAT. 3-13-23 SPENCER KLIXON CONTROL T. M. REG. U.S. PAT. OFF. Cambridge, Mass.

NO invention since that of the gas mantle has attracted such world wide interest. KLIXON Thermostats and Safety Pilots, now available to the gas industry for gas water heaters, will be on display at

Booth 113,

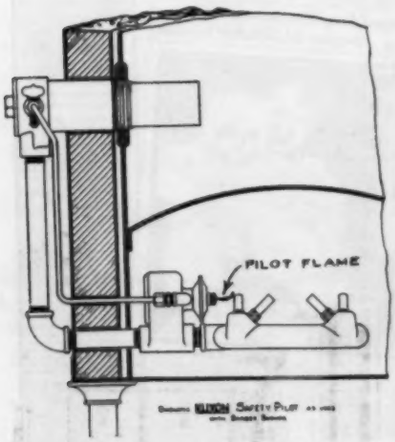
A. G. A. Convention in Atlantic City, October 8 to 12.

"The Million Dollar Thermostat"

SPENCER THERMOSTAT COMPANY

CAMBRIDGE, MASS.

clay, pilot tip is supplied which gives a rugged flame, without carbonizing or stopping up.



The Spencer Thermostat Company have just completed additional laboratory space which will provide research facilities to the gas industry for applying the Spencer Disc to unusual applications, such as Safety Pilots for house heating equipment, safety relief valves, snap acting temperature controls, etc.

Additional information will be sent upon request to this Company.

New Temperature Control

The Time-O-Stat Corporation of Milwaukee, has placed on the market an advancement in low voltage temperature controls.

The name of this new product is Time-O-Stat Temperature Regulator. The outstanding feature is its extreme mechanical simplicity. Only the minimum of attention is needed.

Incorporated in the Time-O-Stat Regulator is a Seth Thomas eight-day clock made by America's finest clock makers; also a Tycos thermometer. These features vouch for the accuracy and dependability of Time-O-Stat Regulators.

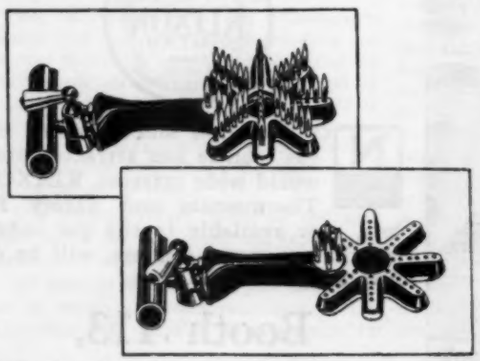
The motor is absolutely silent in operation, while the bearings being self-lubricating require no attention.

A departure from previous principles in temperature control is a snap-action contact blade used exclusively in the Time-O-Stat Regulator. Primarily it affords a cleaner make and break of circuit, and does away with arcing and corroding.

Harper Double Burner for Gas Ranges

This burner consists of a large giant burner and a simmer burner combined—there being two cores n the burner casting. A single air shutter is used, which controls the air in proper proportion to the two parts of the burner, also the main feature is a single gas cock with a separate nozzle for each part of the burner. The operation of the cock has been made to follow the stove users natural habits in that when first closed off somewhat both parts of the burner are lowered to a wide, spread frying heat. A further turning of the cock brings an indicating snap into action, and the gas to the main section is cut off with the simmer portion burning full. Turning the cock further lowers the simmer burner, and then cuts off the gas in the same position as the usual gas cock.

To equip a range with these burners it is only necessary to make a proper burner pattern—for the cock screws into the manifold and occupies the same space as the standard gas cock.



The following advantages are claimed:

1—Two simmer burners on the range.

2—The top lighter lights the simmer burner.

3—This improved burner is put on the two front burners, which are the two most used burners on the range.

4—Saves moving the vessel to put it cn the simmer burner.

5—The simmer burners keep any COVERED vessel up to a four quart size boiling, and cook as fast as a large burner, but without an excess of heat—so the kitchen is not overheated in hot weather.

6—Saves boiling dry and burnt pans because the simmer part boils out very little water. And it saves watching and worry for fear of boiling dry. Actually not more than a quart of water can be boiled away in several hours, which is proof of the fact that the Double Burner eliminates the disagreeable boiling dry, burnt pans and burnt food.

7—Very often it is desired to keep food warm for serving, and a full sized burner gives too much heat even when turned as low as possible. On this account many housewives use an asbestos pad under a vessel. Keeping things warm for serving without the trouble of an asbestos pad is one of the biggest advantages of the Double Burner.

8—With ordinary use the burners will save enough gas to entirely pay for the new range.

This burner is manufactured by Harper-Wyman Mfg. Co., Chicago, Ill., and is being used by a number of gas range manufacturers.

New Process and Chutes Reduce Coke Breakage

A recent improvement reduces coke and coal breakage and the amount of fines, breeze, and dust caused by filling and discharging domestic or water gas pockets, obtains a remixture of segregated sizes in such a manner that a uniform mixture of all the sizes in the pockets is delivered at all times.

This improvement known as the Adams Patent Process and Chutes consists of filling and withdrawing chutes of novel design and containing no moving parts. The filling-chutes are so designed that the material is lowered in controlled avalanches reducing the wear and shock to the individual pieces such as happens in waterfalls and spirals. A cushion of dust is utilized to reduce the wear on the chutes themselves.

The withdrawal chutes are so constructed that the material flows in a solid column from the top of the pile at all times and at no time experiences any fall. They eliminate the grinding and crushing of the sinking mass such as otherwise happens when discharge gates are opened to withdraw the material. A remixture of segregated sizes is obtained simultaneously with the discharging.

Patent Rights on the Process are controlled by Eaton-Kent, Inc., 17 Academy St., Newark, N. J.

New Simplex Pipe Pushing Jack

The pipe is gripped by jaws in the center of the Jack illustrated, and one or two men operating each of the two levers, cause the pipe to be pushed through the ground powerfully and accurately.

These Simplex Jacks are built in two sizes—the No. 332 for pushing pipe of ¾" to 2" in diameter—and the No. 334 for pushing pipe of 2" to 4" in diameter—a feature being that each size of pipe

AN IDEAL GAS BOILER *for* EVERY *heating need!*

For cottages or bungalows—with or without basements—an Ideal Arcola Gas Heater!

For small or medium-sized homes —Ideal 1G Gas Boiler!

For larger homes and buildings— Ideal 4G Gas Boiler!

For office buildings, big apartment houses, hotels — Ideal 4G Gas Boilers in multiple units!

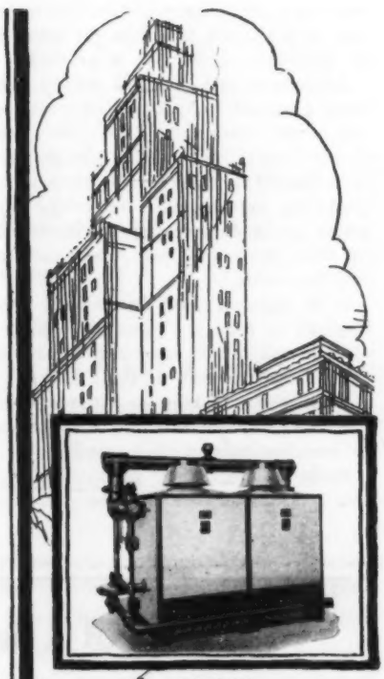
All these boilers are useful for large-volume hot-water supply and industrial applications.

THIS whole family of perfectly-designed gas boilers offers you *exactly* the right heating plant for *every* job on which you want to figure.

Designed and manufactured by the American Radiator Company, it is the latest triumph of their boiler engineers.

Ideal Gas Boilers are made available to you without delay by strategically-located distribution centers.

We have prepared for you a plan book covering every detail of selling plans that actually *work*. Won't you send for this complete and practical information?



IDEAL GAS BOILERS

Product of AMERICAN RADIATOR COMPANY *Gas Utilization Dept.*

Write to AMERICAN GAS PRODUCTS CORPORATION, *Distributors*

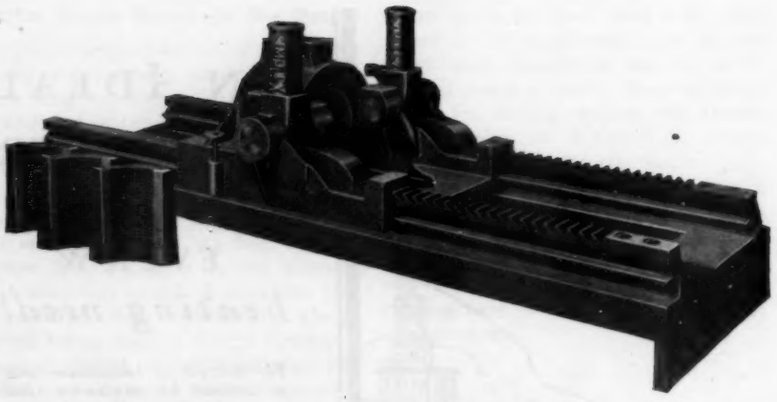
376 Lafayette Street, New York City

requires a set of jaws to conform to the size of pipe, and by which the crushing or distorting of the pipe is avoided.

Laboratory and practical service tests have governed every detail of construction and operation, and the materials used and their design are co-ordinated for the single purpose of producing service and longevity, and which has made necessary the liberal use of alloy steels and their heat treatment and hardening.

It is claimed, that the average time required to push a 3" pipe through 25" of solid soil is between 5 and 6 minutes, using 2 men on each of the 2 levers—or approximately 23 man minutes, which time also includes resetting the pushing or traveling portion of the jack.

Bulletins descriptive, or moving picture reels illustrative of the Simplex



Pipe Pushing Jacks in action. may be obtained from Messrs. Templeton, Kenly & Co., Ltd., Chicago, who are the sole manufacturers of the Simplex Jacks, or from the 66 branch offices of the Graybar Electric Company, Inc.

News of The Gas Industry

Gas Merchandisers Frolic on Lake Erie

Even gas merchandising executives have their lighter moments, as reports from the Labor Day week-end party sponsored by The Tappan Stove Company, of Mansfield, Ohio, will indicate. It was a merry little group that set out for Catawba Island on Lake Erie that day. Golf, swimming, boating and fishing were in order.

Names, left to right, Stanley Jenkins, W. H. Tappan, Harvey A. Keys

Harvey A. Keys, of the Equitable Sales Co., Pittsburgh, and Stanley Jenks of Northern Indiana Public Service Co. were there. Also George Clausen of Hibbard, Spencer, Bartlett & Co., Wilfred Shaffner, furniture store merchant of Marion, Ohio, and W. H. Tappan, Cleve McConnell and Keith Miller of the Tappan Stove Company.

P. R. Tappan paid the party a visit in his express cruiser "Sinbad" and converted the gas men into sailors for the day. Harvey Keys seemed to take a particular interest in the "Sinbad" cabin, where he found a number of charts, over which he was poring intently when some unkind sailor asked him why he didn't hold it right side up.

Some Natural Gas Events In The Rocky Mountain Regions

Vernal, Utah is anxious for natural gas, but the franchise as submitted by Orman W. Ewing, president of the Westland Oil Inc., of Salt Lake City does not meet with the approval of the Vernal officials. If the parties involved can come to an agreement the gas will likely be piped to Vernal from the Ashley valley structure, located about ten miles from Vernal. Ewing must guarantee the gas at a certain time or forfeit his rights.

Rocky Mountain coal men are opposing the piping of natural gas to Utah from the Wyoming fields. The Utah board of public utilities have slated October 10 as the date for hearing them and in the interim has withheld giving the Ohio Oil Company permission to build the pipe line, but this is probably only to conform to the law. Many cities enroute and the city of Ogden, Utah, have signed up for the gas and it is believed that Salt Lake City will do likewise.

The Loveland Brick & Tile Company of Loveland Colorado and the United States Gypsum Company's plant just north of Loveland are to get natural gas service from a ten mile pipe line being built by the Berthoud Service Company of Berthoud, Colorado. The gas will come from the well of the Five Square Oil & Gas Company of Larimer County, Colorado.

Fort Wayne Meter Readers Blossom Forth

By their dress ye shall know them. Residents of Fort Wayne, Ind., easily can recognize the meter readers and the collectors of the Northern Indiana public service Company, for these employes have been garbed in blue uniforms and they wear a cap bearing the letters N.I.P.S. Co. During the summer months a dark blue shirt takes the place of a coat as part of the uniform.

This information is being broadcast by S. E. Mulholland, vice president of the company, as a result of the recent activities there of fraudulent persons who claim to be agents of the company.

"Not only are our meter readers and our collectors uniformed," Mr. Mulholland said, "but our other employees, such as fitters, inspectors and the like who have occasion to go into homes, carry a double identification; first, a badge, and second, a card which they will show gladly upon request. We want residents to know that no man is an employe of our company who can not easily and quickly identify himself."

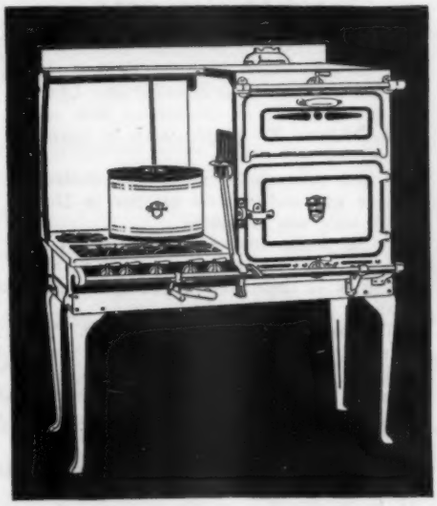
To Construct Pipe Line

The Illinois Power and Light Corporation is preparing for the construction of gas pipe lines from Edwardsville through Staunton to Mt. Olive, Carlinville and Litchfield. Gas is supplied from the St. Louis Coke and Gas Company at Granite City and the new system will supplant the small artifical gas plant being operated here now by the corporation. It will be the second gas pipe main in this community, the discovery of a gas field north of here a decade ago encouraging formation of a company which laid a line from this territory into the Edwardsville territory. The well was soon exhausted and the line removed.

A Challenge
to
Gas Sales Managers

THE CHAMBERS AUTOSTAT GAS RANGE CUTS GAS CONSUMPTION TO ABOUT ONE-HALF. We have stated a stubborn fact right at the start. Can you embrace it without flinching?

We hasten to add: most housewives owning Chambers Ranges do much more than an average amount of cooking and baking because less personal attention is required. So you see, if we could keep books on Chambers users, we would likely find that the gas consumption is not seriously interfered with.



However, we want to argue the matter from the apparently unfavorable angle of gas economy. To offset this disadvantage (?), Chambers Autostat Gas Ranges are powerful builders of good will for the stores that feature them. Besides, the Chambers does not compete with any other stove because it is entirely different from any other stove, both in operation and results.

While the Chambers is one of the highest cost ranges on today's market, it is an actual economy to own it. Remember, this stove saves food and time, as well as gas, —a strictly logical buy.

The AUTOSTAT is a new, automatic oven heat regulator. See it in operation at A G A Convention.
SPACE NO. 132

The CHAMBERS AUTOSTAT GAS RANGE, which "cooks with the gas turned off," is now being sold by a number of stove departments in gas utility companies.

The sales managers of these companies put genuine public service ahead of petty present profits. They know the truth of the ROTARY slogan: "He profits most who serves best."

They are smart business men, —make no mistake about that. They have figured the whole matter out to a sound conclusion and they are certain that a close approach to maximum efficiency in the use of gas means increased gas consumption just as sure as the world. Have the gasoline refiners of this country suffered one iota because automobile engineers have been able to pack more miles into each gallon of gasoline?

Besides, if you don't sell Chambers Autostat Gas Ranges someone else will.

Yes, we do want your co-operation in our sales program. As the best qualified advisers on gas in the whole community, we want you to be in a position to make a notably constructive recommendation on gas ranges to your patrons.

Particulars about these ranges, about prices, about sales co-operation,—sent quickly on request.

The Chambers Mfg. Co., *Shelbyville, Ind.*

Another Natural Gas Company Forms

Incorporating under the laws of Delawere and capitalized at ten million dollars, the Memphis Natural Gas Company has been organized for the purpose of transporting natural gas from the fields of Louisiana to the city of Memphis, Tennessee. The pipe is to be 18 inch and the line will be about 218 miles long. For proper functioning, two modern compressor stations of about 6,000 horse power with the necessary equipment will have to be installed.

Steal A Gas and Water Plant

Thieves recently tore away a wall of the corrugated iron building which housed the machinery for the Norphlet Gas & Water Company, of Norphlet, Arkansas, and carried off machinery valued at $50,-000. It is said that there has been some dissatisfaction among some customers and the owner of the plant, S. R. Morgan. Norphleet was without its gas and water service as a result of the theft.

Merger of Three Georgia Companies

Merger of three important gas companies in Georgia has just been announced by F. L. Marshall, manager of the Rome Municipal Gas Company.

The three are the Rome Municipal Gas Company; the Griffin Ice, Gas and Cold Storage Company, of Griffin, Ga., and the Gas Light Company, of Augusta, Ga. The three companies will be known hereafter as the Georgia Public Utilities Company, with a division in each of the three cities mentioned.

There will be no change in the ownership of the three companies, or in the personnel of the different concerns, the merger simply being made in the interest of economy of operation and stronger finances.

The merger will go into effect immediately, it is stated.

Approve Rate Schedule

The Public Service Commission has approved an amended tariff of the Central Hudson Gas & Electric Corp. for gas service supplied in city of Beacon. Schedule effective September 6, 1928, provides a new classification for use of service for residence heating, available to all consumers in city of Beacon. Period of service is limited from September 25 to May 25 inclusive. Rate is $2.05 per M. C. F. for first 300 C. F. of gas per month per 1000 cubic feet of building volume, followed by 75 cents per M. C. F. for all additional consumption per month. Prompt payment discounts 5c per M. C. F.

Rate Hearing to be Held

The Indiana Public service commission soon will hold a hearing in the council chamber at Cambridge City, Ind., regarding the petition of the Eastern Indiana Gas Company for an increase in gas rates to its patrons in Cambridge City field, which embraces that town, also Milton, Pershing, Dublin, Mt. Auburn and other smaller communities. The hearing will be before C. F. McIntosh, a member of the commission.

Binghamton Petitions to Extend Mains

The Binghamton Gas Works has petitioned the Public Service Commission for consent to extend its gas mains into the town of Fenton, under the terms of a franchise granted by the town board of July 23 last. The mains of the company, if its application is approved, will serve the communities of Hillcrest, Hiresville and Ogden in the town of Fenton.

Empire State Gas & Electric Association Annual Meeting

The twenty-fourth annual meeting of the Empire State Gas and Electric Association was held at Saranac Inn, Upper Saranac, N. Y. on September 20th and 21st. About 300 people were in attendance.

A fine program of subjects of interest to the gas and electric utilities in New York state was presented.

Of particular interest was the report of the Association's section chairmen on the activities of their section during the past year.

The retiring president, Mr. H. O. Palmer of the Empire Gas & Electric Company of Geneva, N. Y. presided and addressed the meeting on the Association work during the past year with comments on future activities.

The business sessions were held during the morning with the afternoons given up to recreation.

A golf tournament for the men was directed by Chairman, W. C. Fisher of the Westchester Lighting Co. Boat rides, auto rides and bridge were arranged for the ladies in charge of Miss Helen Smith of the Rochester Gas & Electric Corporation, Chairman of the Women's Section.

The officers and members of the Executive Committee elected for the coming year were as follows:

President: Charles S. Ruffner, President, Mohawk Hudson Power Corp., Albany.

1st Vice President: William J. Welsh, President, New York & Richmond Gas Co., Stapleton.

2nd Vice President: F. A. Stoughton, President, St. Lawrence County Utilities, Inc., Potsdam.

Treasurer: S. G. Rhodes, New York Edison Co., N. Y.

Members of the Executive Committee

Class of 1929—D. E. Manson, President, Rockland Light & Power Co., Nyack.

Class of 1931—M. S. Sloan, President, New York Edison Co., New York; H. O. Palmer, Vice President, Empire Gas & Electric Co., Geneva; E. H. Rosenquest, President, Westchester Lighting Company, Mt. Vernon; J. C. DeLong, President, Syracuse Lighting Co., Syracuse, N. Y.

Negotiating for Gillespie Company

Negotiations are under way for the purchase of the Gillespie, Ill., Gas Company by the Illinois Power and Light Company and engineers for the latter have been busy in recent weeks making final check of holdings of the company, which was recently formed and has extended mains throughout the city. Gas is secured from wells south of Gillespie.

Seeks to Purchase Pipe Line

To enable it to transport additional natural gas from its Allegany County, (N. Y.) wells and thereby provide better service for consumers in Olean, Portville, Friendship, Angelica, Belmont and adjoining towns, the Producers Gas Company has made application to the Public Service Commission for authority to purchase from the Empire Gas & Fuel Company, Ltd. an eight inch pipe line, 11 miles long, from a pumping station near Sandford, Allegany County, through Portville to Olean, the price to be paid being $1 a foot. The Producers company now gets gas from the Allegany county field through a six inch pipe line which, it states, has not sufficient capacity to carry all the gas needed from the Allegany county field to Olean. The eight inch pipe line was recently secured by the Empire company from the Iroquois Gas Company.

Government Publications

Prices indicated are charged by the Superintendent of Documents, Washington, D. C., for pamphlets. Send cash or money order; stamps and personal checks not accepted. When no price is indicated pamphlet is free and should be ordered from bureau responsible for its issue.

Desirable Characteristics of Coke: Chemical, by J. D. Davis. Bureau of Mines Serial 2884.

Standardizing the Open Flow From Natural Gas Wells, by R. R. Brandenthaler, E. L. Rawlins, and T. W. Johnson. Bureau of Mines Serial 2885.

Recent Developments in the Production of Motor Fuels From Coal, by A. C. Fieldner. Bureau of Mines Information Circular 6075.

Sources and Distribution of Major Petroleum Products, Atlantic Coast States—

New reduced prices widen the market for RICHMOND HEATOMAT GAS BOILER

"Light in the fall —that's all"

A RICHMOND HEATOMAT gas installation—the ideal form of automatic heating—is now within reach of thousands of home-owners.

New lower prices on every type of Heatomat are made possible by the economies of increased production—the result of rapidly increasing sales.

Our tested cooperative sales plan makes it easy to interest prospects and closes sales. There is a handsome profit to be made on the Heatomat. Get the facts.

Richmond Heatomat Gas Boilers are being installed in a large percentage of all new building operations and open up practically an unlimited new field of business in replacing old coal boiler installations with this most modern of heating plants. All that a Heatomat requires is to light in the Fall—That's All. It is entirely automatic and fool-proof.

The complete line of Richmond Heatomat Gas Boilers for hot water, steam and vapor systems, equipped with complete operating controls, is approved by the American Gas Association, for efficiency and safety of operation.

Write for full details of the Richmond Heatomat, our new price sheet and our helpful cooperative sales plan. Richmond Radiator Company, Inc., Office of Gas Products Division, 2220 Chestnut Street, Philadelphia, Pa. Factory, Uniontown, Pa.

General Executive Offices:
1480 Broadway
New York, N. Y.

Richmond Radiator Company, Inc.
Gas Products Division
2220 Chestnut St., Philadelphia, Pa.

You may send me New Price List, catalogs, and details of the Richmond Heatomat Gas Boiler.

*Name*_____

*Address*_____

*City & State*_____ A. G. J.-10

Branch Offices:
Philadelphia
Boston Chicago
Cleveland

1927, by E. B. Swanson. Bureau of Mines Information Circular 6080.

Transmissive Properties of Eye-Protective Glasses and Other Substances, by W. W. Coblentz and R. Stair. Bureau of Standards Technologic Paper 369. 10 cents.

Carbon Black Produced From Natural Gas in 1927, by G. R. Hopkins and H. Backus. Bureaus of Mines Mineral Resources separate. 5 cents.

Fuel Briquets in 1927, by F. G. Tryon and J. M. Corse. Bureau of Mines Mineral Resources separate. 5 cents.

Petroleum, Petroleum Products, and Natural Gasoline, 1927 (Final Summary). Bureau of Mines annual statistical statement No. P 40.

Commercial Stocks of Anthracite and Bituminous Coal, July 1, 1928. Bureau of Mines Coal Stock Report No. C. S. 28.

Obituary

JAMES T. LYNN

Funeral services for James T. Lynn, 72 years old, who for many years was connected with public utility and industrial interests in Michigan, were held on Sept. 17, at Detroit.

He was born in Pittsburgh, Feb. 18, 1856. After receiving his education in the schools of Allegheny, Pa., he was employed for several years as a locomotive engineer on the Northern Pacific railroad.

While still in his early twenties, Mr. Lynn obtained employment with a gas company in Allegheny and was prompted rapidly to an executive position. He went to Detroit in 1893 and became connected with the gas industry there. Five years later he formed the National Gas, Electric Light & Power Co. by consolidating 14 public utility companies in a number of cities. He also was the general manager of the Detroit City Gas Co. for a time.

Mr. Lynn served as chairman of the Public Lighting Commission of Detroit for 12 years. In 1917, he went to Washington, D. C., and as a dollar-a-year man, acted as director of the Bureau of Gas for the duration of the World War.

The public utility company was purchased in 1917 by the United purchased in 1927 by the American Railways Co., of which Mr. Lynn continued as a director. In 1921 he was made executive head of the White Star Line, a Detroit river steamship company. He retired several years ago and since has spent his winters in California.

Mr. Lynn was a member of the Detroit Club, the Detroit Country Club, the Bloomfield Hills Country Club, the Detroit Athletic Club, the Lotus and Engineers' Club, of New York City, and the Chicago Athletic Club. He leaves his wife, Mrs. Frances Louis Lynn.

Personals

R. Lee Davis, former assistant superintendent of utilization for the Public Service Company of Colorado, has been advanced to superintendent of that department. Albert A. Klinge moves up to the safety and claims division and will become assistant manager under F. A. Tewksbury.

Klinge came to the Denver office from the Montgomery Light Water & Power Company, Montgomery Alabama in 1909, being appointed superintendent of the utilization department four years ago.

Davis started with the company twelve years ago as a gas fitter. He is the inventor of a combustion device now in use with the natural gas service.

G. W. Allen, who for many years was in charge of Advertising for the Consumers' Gas Company of Toronto, and many years secretary-treasurer, Canadian Gas Association, has again been reappointed for the fifth year in succession to the position of Instructor in Advertising with the Central High School of Commerce, Board of Education, at Toronto, Canada. Mr. Allen now has three classes in this interesting work at the above mentioned school. These classes are conducted on Friday evenings of each week during the fall and winter months of each year and are open to young men and women interested in the study of advertising.

Frank E. Patton, who has held controlling interest in the Vinton Gas, Iowa, company has disposed of his holdings to the Iowa Railway and Light company of Cedar Rapids, which has announced that it will continue the plant without any change in personnel. Mr. Patton has been secretary and manager five years. The Vinton Gas Company is incorporated with $60,000 capital. E. T. Bryant, is president; J. A. Countryman, vice president; Joe C. Carrier, treasurer and Mr. Patton, secretary.

B. H. Gardner has been appointed Director of Sales of Columbia Engineering and Management Corporation, same to be effective October 1st.

Mr. Gardner will supervise and coordinate the new business activities, both gas and electric, of Columbia System properties, in cooperation with the executives and commercial departments of the various companies.

His headquarters will be in the Columbia offices at Columbus, Ohio, which location will be central to the major operating divisions located in Pittsburgh, Pennsylvania, Columbus, Dayton and Cincinnati, Ohio, and Charleston, West Virginia.

Mr. Gardner's first connection was with the Dayton Power & Light Company, one of the subsidiaries of the present Columbia System. He was with the Dayton Company from 1906 to 1912, being in the sales end of the business most of that time. For nine years he was with the Connecticut Light & Power Company with headquarters at Waterbury, Connecticut, having charge of all sales and advertising, and serving for several years as local manager of some of their properties. For the past seven years he has been connected with the Northern Indiana Public Service Company; for three years as local manager of the gas and electric property at Lafayette, and for the past four years as Assistant to the Vice-President at the main office at Hammond, Indiana.

He is now serving as Chairman of the Water Heating Committee of the American Gas Association and as a Director of the Indiana Gas Association.

Walter E. Long, vice president and controller of The Philadelphia Electric Company, has been elected vice president in charge of acounting of The United Gas Improvement Company. He succeeds George W. Curran, who resigned as vice president and secretary. John Hopkins, assistant secretary of The U. G. I. Company, was advanced to the post of secretary.

Edward Porter, general auditor of the U. G. I. Company, has been appointed controller of The Philadelphia Electric Company, and is succeeded in his former post by Albert S. Corson, who had been assistant general auditor. Mr. Porter also was appointed controller of the Philadelphia Suburban-Counties Gas and Electric Company.

In announcing the changes, Arthur W. Thompson, president of the U. G. I. Company, said, "Mr. Curran's retirement from the dual office does not deprive the company of his valuable services as he will continue his connection with the U. G. I. organization in a consulting capacity. Mr. Curran has been associated with the U. G. I. and subsidiary companies for thirty-nine years."

Mr. Long entered the employ of Philadelphia Electric as a bookkeeper in 1904.

Mr. Curran became associated with The U. G. I. Company as assistant general auditor in 1902.

Mr. Hopkins started his public utility career in the Accounting Department of the American Gas Company thirteen years ago and on January 1, 1927, he became assistant secretary of The U. G. I. Company.

Mr. Porter, who has been with The U. G. I. Company for thirty-four years, started as a clerk in the Accounting Department.

Mr. Corson entered the employ of The U. G. I. Company as a bookkeeper and clerk in 1906.

S. G. Watson, of the Research Staff of the Holmes Company of Huddersfield, England, who are the originators and patentees of dehydration of gas by the calcium chloride method, is at present in this country. He has his headquarters at the offices of West Gas Improvement Company, 441 Lexington Avenue, New York City.

THE KOMPAK CO.

Automatic Thermostatic Gas Water Heaters

NEW BRUNSWICK
NEW JERSEY

Large Volume Water Heating with the

NEW KOMPAK HOUSE HEATING BURNER

The development of this marvelous burner for converting coal heaters to the use of gas—has opened the way for the greatest development in large volume water heating that has ever been made.

Coal Water Heating systems of every description can now be converted into *economical, automatic* and *satisfactory gas* heaters at an expense of less than $200.00 installed.

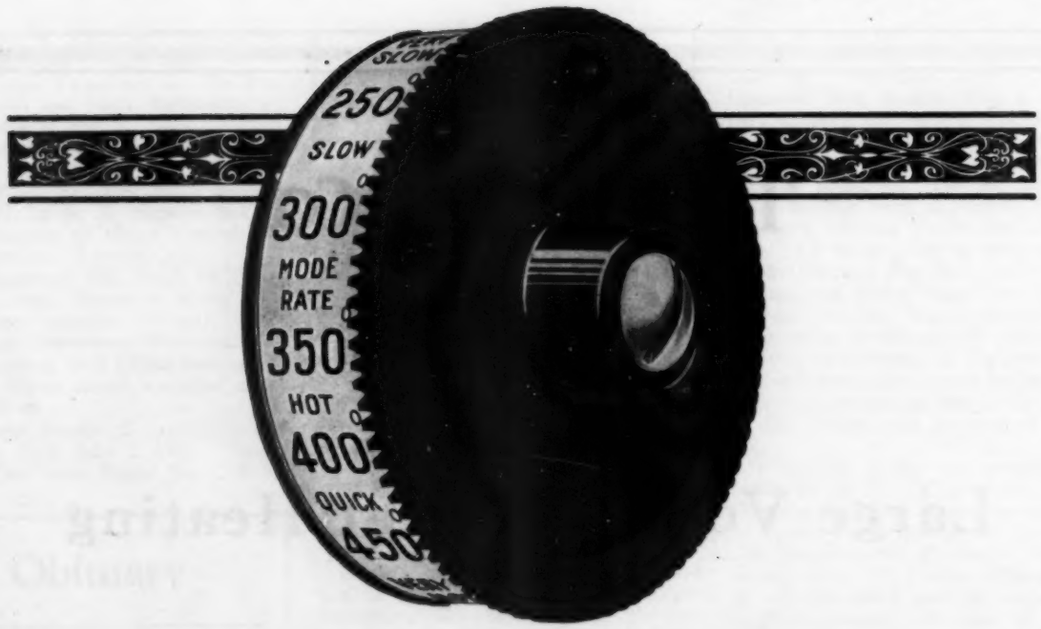
Once more Kompak has initiated an improvement that is destined to revolutionize gas water heating in large buildings.

Be sure and get particulars at the

KOMPAK BOOTH 337

at Atlantic City.

THE KOMPAK COMPANY
NEW BRUNSWICK, N. J.



"Goods Well Displayed Are Half Sold"—ANON

Twice each year American Stove Company distributes among its thousands of retail outlets an attractive and complete window trim.★ This "service" costs the trade absolutely nothing. And it gives Red Wheel Dealers an opportunity to dress their windows in a manner that will attract attention and increase sales.

★American Stove Company is the only gas range manufacturer who does this. The cost of this service equals the total advertising appropriation of many gas range manufacturers.

AMERICAN STOVE COMPANY
801 Chouteau Avenue .. .. *St. Louis, Mo.*
LARGEST MAKERS OF GAS RANGES IN THE WORLD

These are the Six Famous Brands of Red Wheel Gas Ranges:
DANGLER · CLARK JEWEL · QUICK MEAL · DIRECT ACTION · NEW PROCESS · RELIABLE

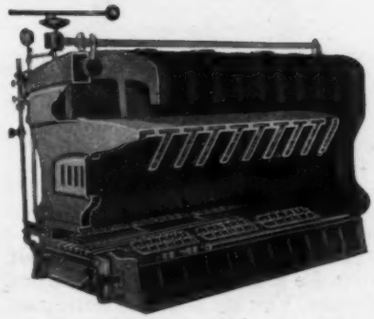
LORAIN RED WHEEL

Conversion Work is Done Better with

BARBER Patented JET GAS BURNERS

There are many good reasons why Gas Companies should standardize Barber Burners for conversion work. The principle of combustion utilized in Barber Burners is the outstanding improvement in gas burner design during the last half century. Barber Burners are based upon a scientifically correct principle that develops the highest efficiency and hottest flame temperature of any gas burner operating on atmospheric pressure. Impartial and authoritative tests prove Barber Burners are from 15% to 35% more efficient than any other types of gas burners.

On Barber Burners the air and gas adjustment is fixed and automatic in its operation. A premixture of air and gas takes place in the jet tubes, and auxiliary primary air is introduced above the jet tubes where the two flames meet. As the premixture of air and gas leaves each pair of jets, there is an attempt to create a vacuum at the point of confluence of the two flames. At the same time, there is a constant attempt on the part of nature to break up the vacuum, with the result that there is always drawn into the flames exactly the amount of additional primary air required to insure perfect combustion.



Barber Burners are equally efficient on Natural, Artificial or Mixed Gas; develop a flame temperature of at least 1960° F. on normal gas pressure; most economical in gas consumption; dependable on all kinds of gas conditions; no adjustable parts; nothing to break or get out of order; no gauzes to clog or burn out; safely act as their own pilot—*and can not be made to back-fire.*

Barber Burners are furnished in a great variety of designs, sizes and capacities, which renders them exceedingly flexible in their application to the exact requirements of any type of heating device. The correct Barber Burner assembly properly installed, guarantees the user the utmost satisfactory service. Equipped with a Gas Pressure Regulator and Temperature Control, the installation is automatic in its operation.

Correctly specified and properly installed they are free from service troubles. More than a million Barber Burners are rendering the users the utmost satisfactory service. They will render your company and its customers the same high degree of satisfaction.

You are cordially invited to visit our booth at the A. G. A. Exhibition in Atlantic City.

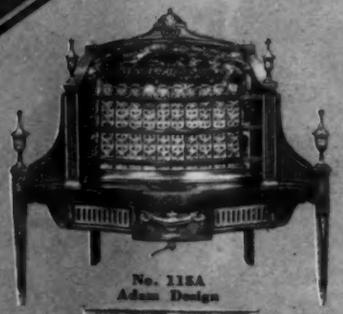
COMPANY MEMBER OF AMERICAN GAS ASSOCIATION

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue, Cleveland, Ohio

Classic MODELS

PERIOD DESIGNS

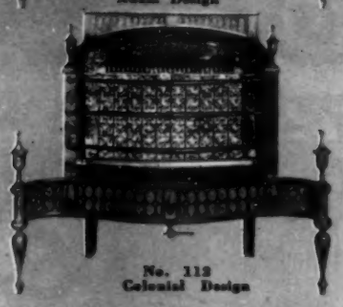
No. 130A
Queen Anne Design



No. 115A
Adam Design

No. 90
Early English Basket Design

TO SELL YOUR TRADE



No. 112
Colonial Design

Making a home not only warm and cozy but a thing of beauty, is the function of the Humphrey Radiantfire Period designs.

There is: *The* Early English with Haddon Hall Andirons—*The* Adam—*The* Queen Ann. *The* Early American *and other period designs.*

They will harmonize and add to the appearance of any room. Not merely are Humphrey Radiantfire Period designs warm, efficient heaters, without smoke, ashes or soot, but they advertise the gas business in a dignified original manner. You are not only selling an added unit when selling Humphrey's Radiantfire Period Designs and trading in profitable merchandise but at the same time you are getting an additional outlet for a greater gas consumption. Write us for full information on Humphrey Radiantfire Period designs.

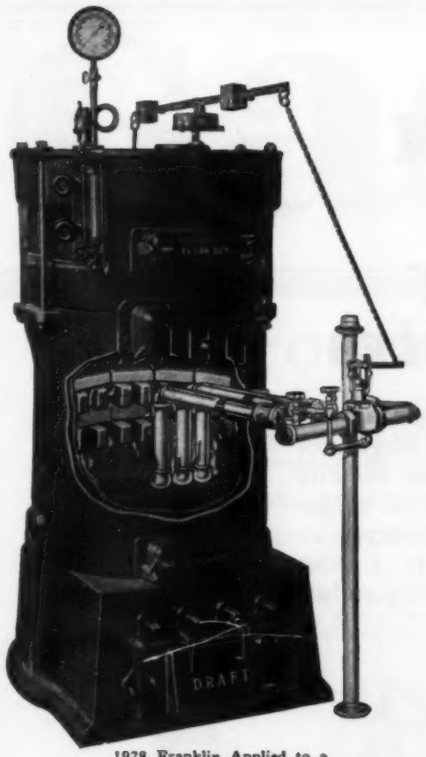
GENERAL GAS LIGHT COMPANY, *Kalamazoo, Michigan*

New York: 44 West Broadway

San Francisco: 135 Bluxome Street

The HUMPHREY Radiantfire

IF IT ISN'T A HUMPHREY—IT ISN'T A RADIANTFIRE



1928 Franklin Applied to a House Heating Boiler

Up to the Minute!!

The *New* 1928 FRANKLIN Gas Burner

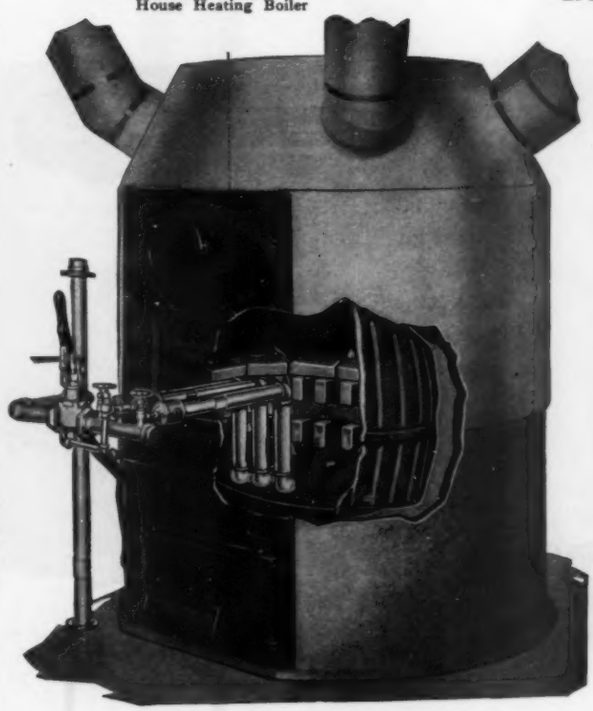
The New 1928 Franklin was designed by Franklin Engineers who have had years of experience with the best methods used in the combustion of gases. Exhaustive tests were made to perfect this new burner so as to best meet the requirements and the pocketbook of the modern home.

Automatic regulation of air assures intense blue flame under all conditions. Burns natural or artificial gas or their combination.

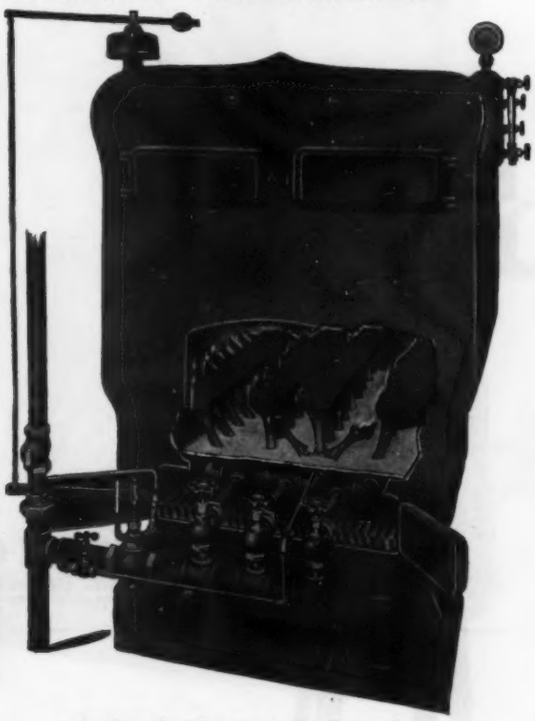
Flame will not extinguish on low pressure. No back-firing in the mixer. Approved by the fire insurance companies.

Up to the present time more than 200,000 Franklin Gas Burners of different sizes and models are giving satisfactory service.

GET YOUR SHARE OF THE HOUSE HEATING BUSINESS WITH THE NEW 1928 FRANKLIN GAS BURNER!



1928 Franklin Gas Burner Applied to Hot Air Furnace

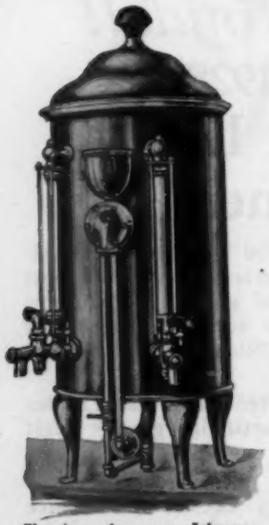


1928 Franklin High Power Gas Burner System

Patented and Manufactured Exclusively by

THE FRANKLIN GAS APPLIANCE COMPANY

Cincinnati, Ohio.

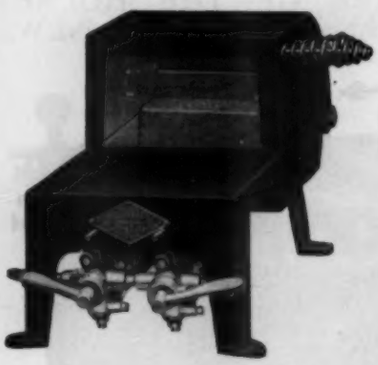


Showing the new Johnson Automatic Thermostatic Control and Burner mounted on folder giving full details of standard Urn. Write for this new invention which is gaining wide acceptance and successful use.

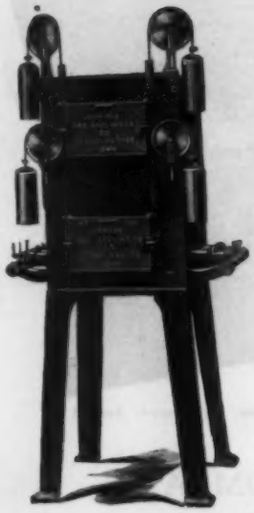
JOHNSON

QUALITY
GAS APPLIANCES

All Johnson appliances are equipped with the Johnson Patented Direct Jet Regulator which insures the greatest possible velocity at the nozzle and directs a solid jet of gas in perfect alignment with the Bunsen.
The economies achieved provide a most persuasive argument for converting industrial prospects into users.



Whatever may be your requirements, whether they be special or standard, write to us for full information concerning our ability to serve you.



JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Gas-Era

Cast Iron Furnaces and Boilers

The correct type of equipment for any building. Boilers from 420 to 12,600 sq. ft. Steam and 670 to 20,100 sq. ft. Hot Water rating. Furnaces for the small bungalow or the largest theatre.

Specially constructed units for Forced Air heating.

Cast iron sections. Corrosion-proof. Leak-proof, ground joints. Complete automatic controls.

L. J. MUELLER FURNACE CO.
Manufacturers and Western Distributors
187 Reed St., Milwaukee, Wis.

RICHARDSON & BOYNTON CO
Eastern Distributors
260 Fifth Ave., New York, N. Y.

See complete display at A. G. A. Convention Booth No. 129

GAS-ERA FURNACES and BOILERS

Ko-Ray

HOTEL AND RESTAURANT RANGE

"Works Splendidly"—says *Windermere.* "Our chef likes our Ko-Ray Range very much. There is a marked improvement in the flavor of food that they turn out. The cooking time is greatly decreased over other appliances, and we are cooking everything we possibly can in the Ko-Ray. I don't hesitate to recommend it to any hotel, restaurant, club or institution."—Wilbur T. Emerson, Vice Pres. and Gen. Mgr., HOTELS WINDERMERE, Chicago.

"Fine-Colored, Juicy Roasts—Delicious Pies"—*Bismarck Hotel.* "The Ko-Ray Hotel and Restaurant Range does all the manufacturers claim for it in every way. We have turned out very fine-colored, juicy roasts. We have also made very delicious pies in the Ko-Ray. I am satisfied that it is a fuel-saving device." Carl Enchelmayer, Steward, BISMARCK HOTEL, Chicago.

"Wonderful Flavor"—*Harrison Huts.* "We are having very good success with the Ko-Ray Hotel and Restaurant Range. We bake all our hams in it, and cook vegetables, roasts—in fact, most anything. It imparts a very wonderful flavor to the food. None of the quality goes out of it. It cuts down both on gas and on time in cooking." B. C. McKnight, Mgr., HARRISON HUT, 106 N. State St., Chicago.

"Food Retains Natural Appearance"—*Stock Yard Inn, Chicago.* "I never saw anything in my life like the Ko-Ray Hotel and Restaurant Range. Food cooked in the Ko-Ray not only retains its natural flavor, but, in the case of vegetables, its natural appearance as well. You can hardly tell the cooked, for instance, from the raw asparagus. The Ko-Ray turns out the food twice as quickly as any other cooking appliance that we have used, and with half the consumption of gas. We like it very much, and we are going to use it a lot." J. A. Hill, Mgr. of Hotel Depts., Union Stockyards and Transit Co., Chicago.

"Don't Have To Look"—L. Deutsch, Chicago. "The wonderful part about it is that you don't have to look at the food. You simply put your seasoning into your meats or vegetables, look up your schedule for cooking time, and set the timestat—and the food is done at a certain time. There is no need of any basting. By this method, of sealing the stove when the door is closed, we find that the food retains all the necessary values in flavor." LOUIS DEUTSCH, Chicago.

A Challenge!

IN BOOTH 135, at the Gas Show, we will "Ko-Ray-cook" . . and serve—meat, vegetables—bake and serve pie. We challenge you to say you've ever tasted better food.

Chicago is going big with it. Other cities are duplicating. Write for full description, prices and terms.

A NEW PRINCIPLE in Cooking . . . The Ko-Ray cooks by saturated vapor, and by radiant heat that penetrates the food and seals in the flavor. It boils, bakes, browns, or roasts. It saves on shrinkage. It saves cooking time. It saves greatly in labor and fuel. Its quick operation eliminates excess advance preparation of foods. It is self-basting. It gives unusual quality, tenderness and flavor results. There are no odors, no vapors, no smoke, no excessive heat. The Ko-Ray is automatic in operation . . . yet responds to the chef's skill

Ko-Ray Corporation

110 South Dearborn Street, Chicago

"The Greatest Forward Step in Cooking in the History of Man!"

Bring It Back!

You gas men assembled in convention at Atlantic City will discuss ways and means for retrieving the vanishing domestic load.

Are you aware that the lack of home cooking, which is losing the domestic load, is largely due to the housewife's fear of burned fingers, wrists and hands when oven cooking or broiling on her gas range?

Remove this fear and make safe this very important operation in the preparation of the family meals, help to popularize home cooking and you will quickly stop further losses of the domestic load, and rapidly regain that which has already gone.

Here is a *ready-made* and potent remedy knocking at your very door, that will be of the greatest assistance for increasing sales in your appliance department, at the same time foster the goodwill of the womenfolk.

PARKE SAFETY OVEN SHELVES

Patented June 1, 1926 and Sept. 21, 1926

The Parke Safety Oven Shelves remove the danger and discomfort of oven cooking. The patented handle, always cool, permits the shelf to be drawn out of the oven just far enough to give attention to the roast and broil and prevents the spilling of grease on the range or floor and on garments.

There's a big field for the sale of Parke Safety Oven Shelves as a separate unit and also for ranges equipped with them, as they represent the very last word in Safety, Comfort and Convenience to the housewife.

The Parke Safety Oven Shelves have been tested and approved by the Good Housekeeping Institute and the New York Herald-Tribune Institute, Modern Priscilla, besides some of the largest Gas Companies in the East.

Write at once for further details.

WILLIAM PARKE, Inc.

537-549 So. Second St., Camden, N. J. - - - New York Office, 29 Perry St.

Before You Buy Pipe

Be Sure:

—it has, in proportion, ability to bend and to resist bending

—it is free of inclusions—foreign materials, gas pockets, and blow holes

—it is uniform in wall thickness and true to dimensions. . . smooth outside and inside

—it endures against impact and shock

Unless pipe meets these specifications, it will cost more in service years than Mono-Cast centrifugal cast iron pipe, which meets these practical tests to the letter.

Made in 16-foot lengths, Mono-Cast pipe eliminates one-fourth of the joints in the line—lowering laying costs twenty-five per cent. It is bell and spigot pipe, with the bead *cast on* the spigot end.

It's Cheaper In Service Years!

Visit our Exhibit Booth No. 201, A. G. A. Convention

OFFICES

Chicago
Kansas City
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AMERICAN CAST IRON PIPE COMPANY
BIRMINGHAM, ALABAMA
DISTRICT OFFICES IN PRINCIPAL CITIES

The famous Hunt's Point-Pelham main of the New York Consolidated Gas Co.

In America's Greatest Gas System *...this line of* CAST IRON PIPE carries Gas for a dozen towns

THROUGH this single line of cast iron pipe, the New York Consolidated Gas Co. delivers gas to the kitchenette apartments of the Bronx, and far beyond, to the spacious suburban homes of a dozen Westchester towns and villages. A vital link in America's greatest gas system, it must not fail. That is why the engineers specified Cast Iron Pipe.

Pipe lower in first cost can be found. But for dependability there is absolutely no substitute that even compares with cast iron. Its span of life has never been measured.

Cast Iron Pipe is still in use today after 250 years of service. In fact, *there is no case on record where cast iron pipe has ever failed under usual service conditions.* Once in the ground it can be forgotten. This fact is important to every city official and taxpayer, as well as public service corporations.

Answering Questions

The Cast Iron Pipe Research Association is a storehouse of information on all subjects pertaining to pipe uses. Technical data for engineers and valuable advice for municipalities pertaining to gas or water systems are available to anyone interested. Address: Thomas F. Wolfe, Engineer, Peoples Gas Building, Chicago, Ill.

CAST IRON PIPE

Increase Line Pipe Efficiency with Pittsburgh Seamless

High Carbon Steel Seamless Line Pipe

In Lengths Up to 45 Feet

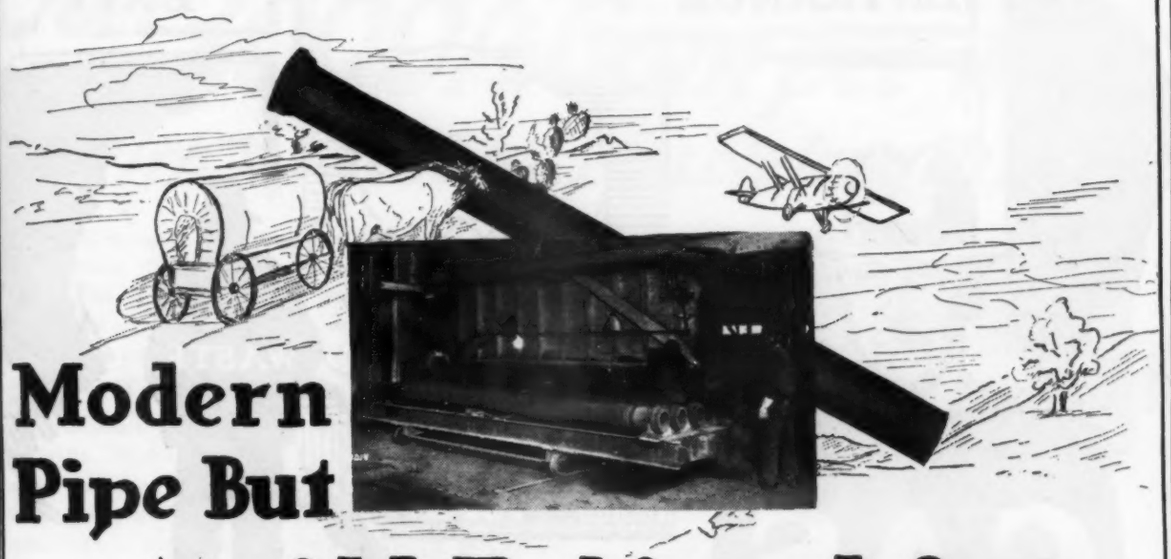
Higher pumping pressures—fewer pumping stations—quicker deliveries—minimum leakage losses—minimum upkeep expense. These are some of the results obtained in the use of Pittsburgh Seamless steel line pipe.

The extra long lengths of Pittsburgh Seamless pipe (about 40 to 45 feet) means fewer joints and great economy in laying the line. Its ⅓ greater strength and the absence of welded pipe seams offer security and operating efficiency that adequately fills modern pipe line demands.

Pittsburgh Steel Products Co.
DIVISION OF
Pittsburgh Steel Co.

PITTSBURGH CHICAGO NEW YORK HOUSTON DETROIT TULSA

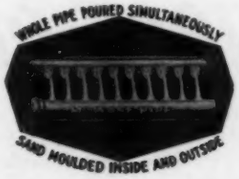
Pittsburgh Seamless *Is Safe*



Modern Pipe But An Old Fashioned Core

True progress is neither hide-bound conservatism nor wild revolution. It is adding the good things of the present to the good things of the past.

One of the good old fashioned things in a pipe foundry was the sand core—that shaped the inside of the pipe. So McWane retains it. But the method of its use is as completely changed as the length of a flapper's dress.



The pipe is modern—stronger iron but lighter in weight—and the core is old fashioned—its refractory qualities giving a smooth interior surface to the pipe barrel, and a metal section easy to tap or cut.

In McWane Pipe you are assured of the long life of old type pipe and the strength and uniformity of the new. Remember, the familiar long-life record of cast iron pipe has been made by pipe "moulded horizontally in sand—inside and outside."

WRITE FOR ILLUSTRATED LITERATURE

McWANE CAST IRON PIPE CO. BIRMINGHAM, ALA.

PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

SALES OFFICES IN PRINCIPAL CITIES

McWANE CAST IRON PIPE

When GAS comes in Waste goes out

Gas, the modern fuel—think what it means to *your* plant.

Think of the storage space gas saves. Think of the man-power it conserves.

Think, too, of the interest it saves. No capital tied up in fuel storage, for gas is not paid for until *after* it has been used.

And again—think of the cleanliness—the elimination of soot and dust—the better working conditions—the increased efficiency of employes.

Above all—think of the perfect control which gas heat affords—the extreme flexibility—the absolute dependableness.—Visualize the better product this makes possible—the lessened spoilage—the increased production.

√ √ √

And remember, whether *your own* plant is large or small, gas offers you all these fundamental advantages, all these basic economies. Telephone or write to your local gas company; they will gladly show you exactly what these advantages and economies can mean to *you*.

For free copy of book, "Industrial Gas Heat", address

American Gas Association
420 Lexington Avenue, New York City

YOU CAN DO IT BETTER WITH GAS

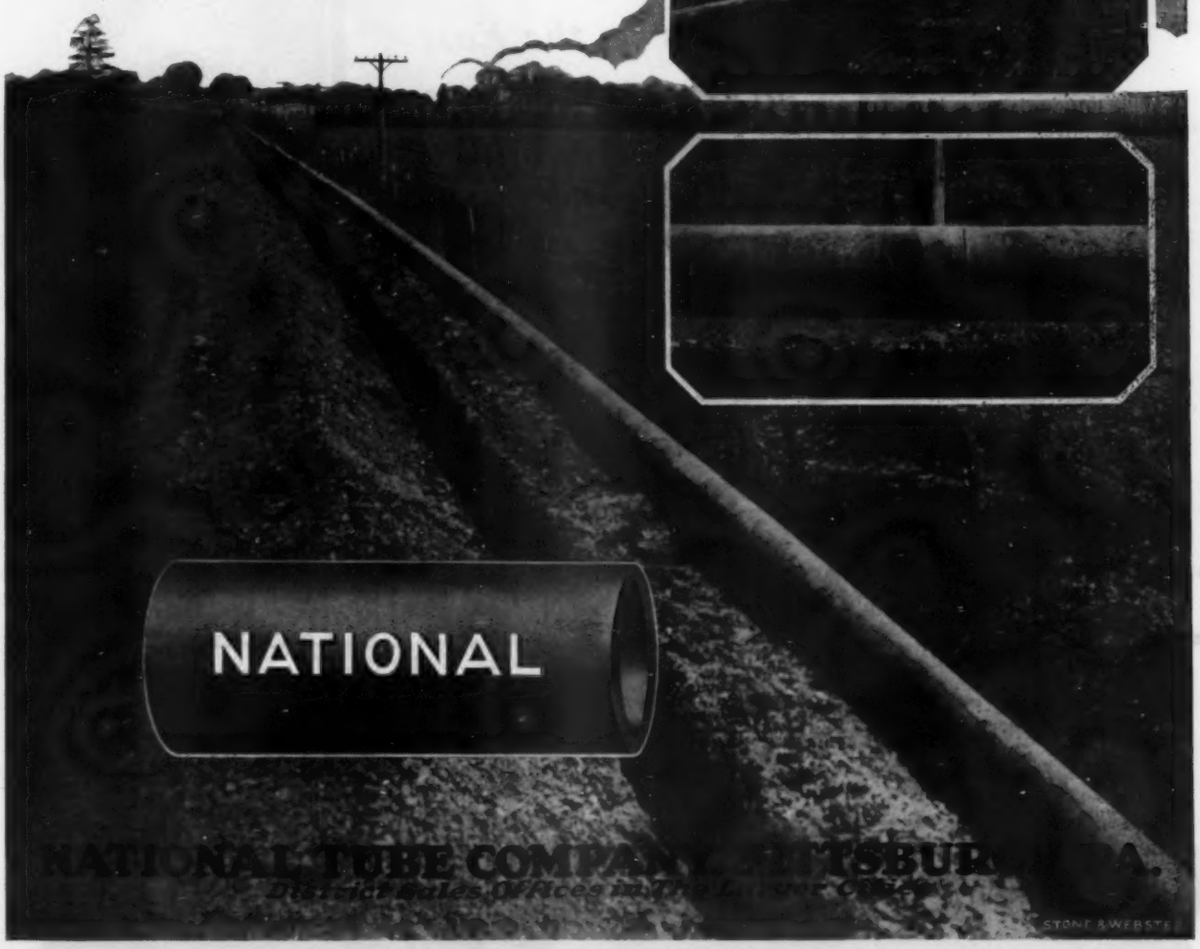
Over 3000 ft. Gain per week with "NATIONAL" Double length Pipe!

FIVE welders, working on this 18 mile line of 12-inch "NATIONAL" Double-length Pipe, joined 34 lengths in one day. With the average length of pipe about 35 feet, or double the ordinary length, a gain of over 3000 feet of pipe laid per week is apparent.

In addition to the advantage of double random lengths, "NATIONAL" Pipe is especially desirable for gas lines because of its high tensile strength, uniform structure and good welding qualities— which assure you a strong, sound line from end to end.

"NATIONAL" is the only pipe made in double random lengths.

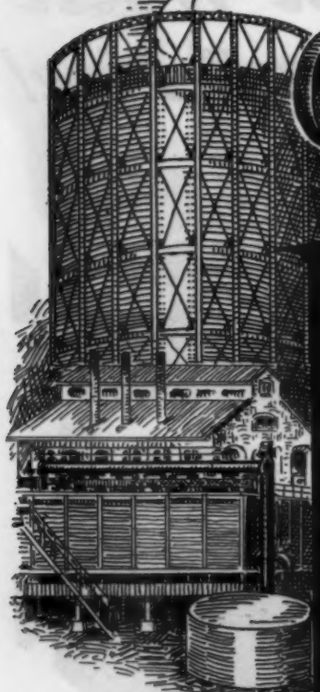
Ask for "National" Bulletin No. 26



NATIONAL TUBE COMPANY, PITTSBURGH, PA.

District Sales Offices in Principal Cities

IRON BORING OXIDE



VISIT
BOOTH - 101
A·G·A· CONVENTION
and learn why the Largest Gas Plants in the East prefer to use our
IRON BORING OXIDE
!

GAS PURIFYING MATERIALS

COMPANY INC.

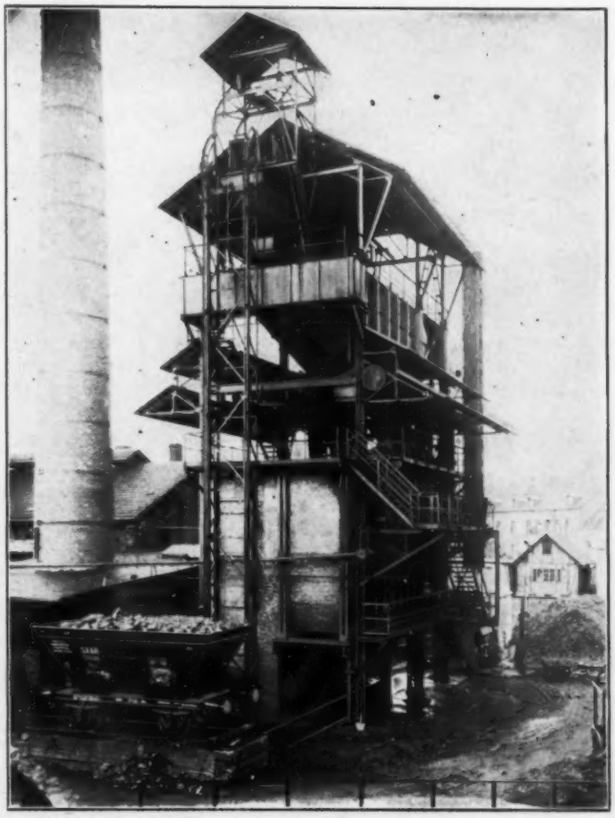
FOOT OF HALSEY STREET - - - - LONG ISLAND CITY
· NEW YORK ·
BRANCH YARD—PROVIDENCE, R. I.

"INDUGAS"

VERTICAL CHAMBER OVENS

With Water-sealed Drop Door

INTERMITTENT TYPE



Minimum Labor
Low First Cost

The annual operating reports of the Association of Swiss Gas Plants disclose that the "INDUGAS" ovens produce the largest yields of gas per ton of coal.

The following table shows the actual average yields from coal containing less volatile matter than the average American coal:

City	Time	Yield cu. ft. per net ton	Heating value B.t.u. (gross)
Baden, Switzerland	4 years average	14075	560
Olten, Switzerland	2 " "	13317	570
Friedrichshafen, Germany	4 " "	16045	515

There's a Reason

Full information, layouts and estimates gladly furnished

CARL STILL CORPORATION

114 LIBERTY STREET, NEW YORK

AT BOOTH NO. 256

American Gas Association Convention

You will see the MacGregor *ROTARY* Valve—the only valve of its kind—exhibited for the first time! ' ' ' You will see why it has so many economical applications to so many types of service in the distribution and manufacture of gas ' ' ' You will see it rigidly tested to prove that it seals positively, turns freely and is self-lubricating ' ' ' In short, you will find it well worth your while to visit Booth No. 256. If you do not see the exhibit, write for full information on this improved valve. ≈ ≈ ≈ ≈ ≈ ≈

MacGregor Valve Co., St. Louis, Mo.

Cleveland Gas Meters have a reputation for dependable service, the result of over thirty years' experience in manufacturing.

Our thoroughly organized and completely equipped factory assure you that the workmanship, materials, accuracy and general efficiency are unequaled.

"A" Type Meters "B" Type Meters

THE CLEVELAND GAS METER COMPANY

2168-2180 East 65th Street Cleveland, Ohio

You are Cordially Invited to Visit Booth 50

BOOTH 450

ISN'T CROWDED WITH MACHINERY -THERE'S PLENTY OF ROOM TO SIT DOWN AND TAKE IT EASY!

WE'VE learned a thing or two from the conventions of previous years—not the least of which is that floor space in the convention hall is probably best used merely as parking space, where you can go in, sit down, and seek shelter from the general whoopee.

We really believe that a few comfortable chairs constitute a much more inviting exhibit than a formidable array of whanging machinery.

This year we've used our floor space accordingly, and for ourselves, we're going to take things a bit easier. Any time you feel like doing likewise, come in. Always glad to see you.

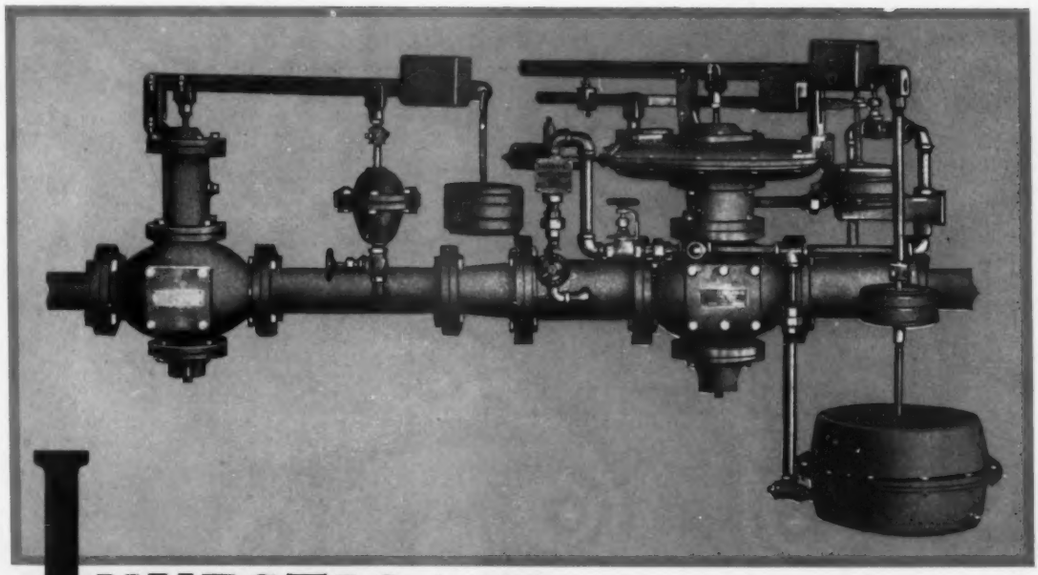
ECONOMY GOVERNOR CO.

ANDERSON, INDIANA

EASTERN REPRESENTATIVES:

MULCARE ENGINEERING CO.

100 Park Place, New York City



INVESTIGATE

THIS NEW

GROBLE
REGULATORS & GOVERNORS

Automatic
District Station Regulator

That Automatically
Increases and Decreases
The Outlet Pressure
According to
Demand

This new Automatic District Station Regulator is being shown at the A. G. A. Convention at Atlantic City, October 8-12. See booths 54-55-Block A.

If you are confronted with the growing problem of efficiently and economically supplying demands out of proportion to your average hourly demands you should investigate the new Groble Automatic District Station Regulator. It automatically increases the outlet pressure the moment the demand increases and reduces it to the minimum as the demand decreases.

Dependable, sensitive regulation, positive in its action, is assured with this new regulator, for it has been developed by an engineering staff that has years of experience in gas pressure regulation and is thoroughly familiar with the problems confronting the gas engineer.

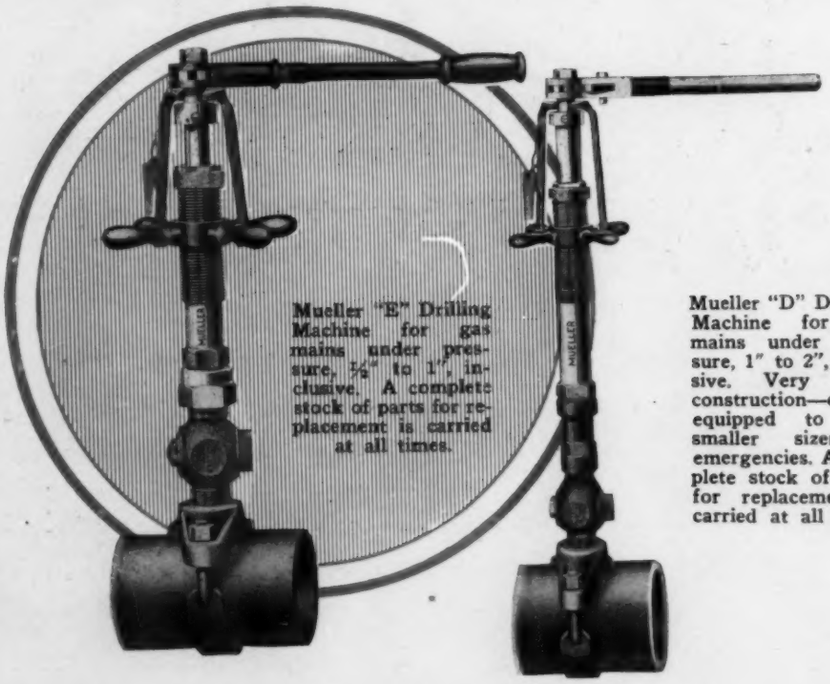
Their services are yours for the asking, in assisting you to solve any problem connected with the distribution of gas. Call on them, without cost, or obligation.

Groble Gas Regulator Co.,
Anderson, Indiana.
Send descriptive literature of the new Groble Automatic Regulator.
Name .....
Address .....
.....

AG 10

GROBLE
REGULATORS & GOVERNORS

Groble Gas Regulator Company
Anderson, Indiana



Mueller "E" Drilling Machine for gas mains under pressure, ¾" to 1", inclusive. A complete stock of parts for replacement is carried at all times.

Mueller "D" Drilling Machine for gas mains under pressure, 1" to 2", inclusive. Very heavy construction—can be equipped to drill smaller sizes in emergencies. A complete stock of parts for replacement is carried at all times.

A pair of drills that *"can't be beat!"*

These drills are examples of a very complete line of drilling and tapping machines which meet every condition that may arise in gas work. Because of long experience in this phase of gas utilities, Mueller is exceptionally well fitted to serve your needs. Made of the finest materials and accurately machined — their efficient operation insures the minimum of physical effort and long life to every part.

Send for full descriptions and prices.

MUELLER CO. *(Established 1857)* **Decatur, Illinois**

Branches: **New York, Dallas, San Francisco, Los Angeles**
Canadian Factory: **MUELLER, Limited, Sarnia**

MUELLER

PIPE ENGINEERING *for* MODERN OIL *and* GAS TRANSPORTATION

Essentially, SMITHWelding is an engineering process that interests the Oil and Gas Industry because it produces, on a mass production basis, pipe that satisfies all the new and complex demands of modern underground oil and gas transportation.

Engineering Its Manufacture

The manufacture of Smithsteel Gas Line Pipe is under the direct supervision and control of the Smith engineering organization that developed and perfected the process of SMITHWelding and its application to the manufacture of Smith Cracking Stills, Couplings and Pipe.

A. O. SMITH CORPORATION
General Offices—Milwaukee, Wisconsin
Oil & Gas Field Products Division
District Offices at New York, Pittsburgh, Tulsa, Houston, Los Angeles

SMITHSTEEL
GAS LINE PIPE

SERVICE TO THE INDUSTRY

REORGANIZATIONS and MERGERS

of the Public Utilities resulting in economies of operation have benefited the entire gas industry.

MANUFACTURERS OF GAS APPLIANCES

now realize the necessity of a similar development in their industry if they are to be of real service to the Utilities in the matter of future sales and dealer cooperation.

INVESTIGATION OF THE INDUSTRY

has shown decided opportunities for economies in manufacturing and marketing. Many manufacturers can improve their situation by *Reorganization, Merger or Refinancing.*

PERMANENT CAPITAL—

is available through my association with reliable banking institutions in Chicago—New York—Philadelphia.

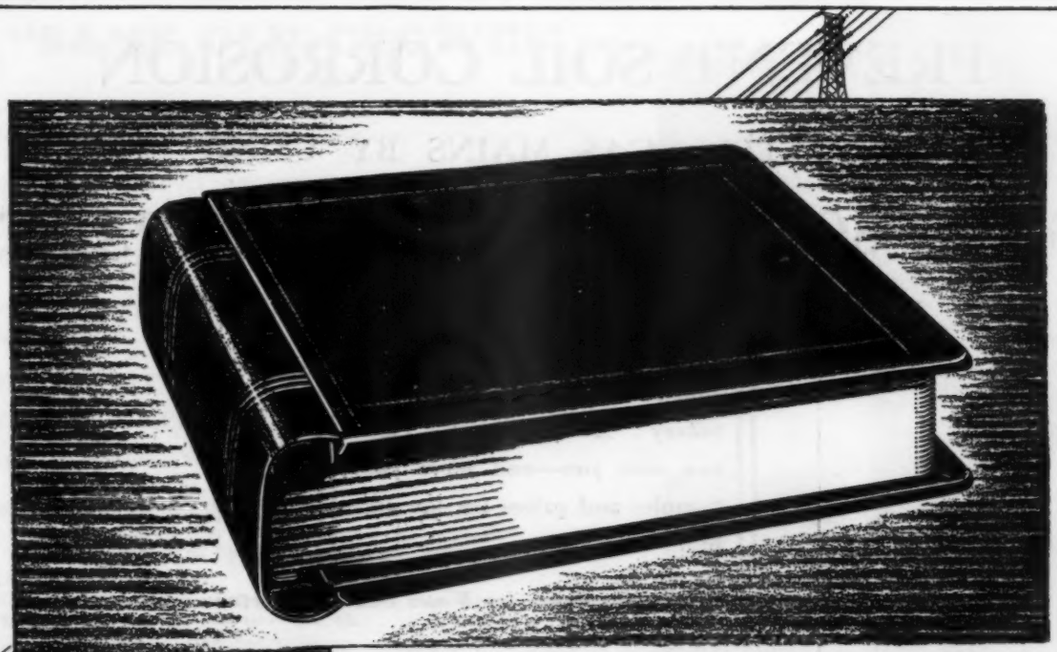
THIS SERVICE IS CONFIDENTIAL—

May we have the pleasure of serving you?

CHARLES W. WARDELL

2401 CHESTNUT STREET, PHILADELPHIA, PA.

P. S. In Attendance at A. G. A. Convention—Oct. 8-12



The Place of proper accounting in building public esteem . . .

AFTER all, the consumer's contact with public service is largely a matter of paying bills. Once a month he writes his check and mails it to the company. Once a month he reacts directly to the reasonab'eness of the charge.

Baker Vawter-Kalamazoo public utility systems route a charge from meter reading to payment of the bill . . . They check each step . . . They provide controls . . . Their accuracy commands consumer confidence . . . Their reliability builds public esteem.

Would you draw on the massed experience of the host whom Baker Vawter-Kalamazoo has served? Send for the Man from Remington Rand. Through him you come into touch with the confidence building methods of the public utilities of America. Let the coupon be your introduction to the Man from Remington Rand.

BAKER VAWTER-KALAMAZOO

DIVISION OF
REMINGTON RAND
BUSINESS SERVICE INC.
Remington Rand Building
Buffalo, New York

Baker Vawter-Kalamazoo Division,
Remington Rand Business Service Inc.
Remington Rand Building, Buffalo, N. Y.

Please send me samples of the forms which comprise the Baker Vawter-Kalamazoo system of consumer accounting. It is understood, of course, that this request does not obligate me at all.

Name .....

Company .....

City .....State .....

PREVENT SOIL CORROSION

OF STEEL GAS MAINS BY USING

SEMET-SOLVAY ACID RESISTING PAINT

If you're laying any new high-pressure mains, you ought to find out how much *more* Semet-Solvay Acid-Resisting Paint can save you—and serve you. Samples and prices for the asking.

We also make By-Product-Coke for Water Gas Manufacture

SEMET-SOLVAY COMPANY

61 Broadway New York City

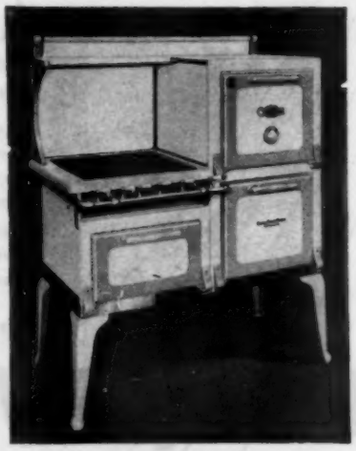
DEHYDRATING EQUIPMENT FOR GAS PLANTS

Aftercoolers
Feed Water Heaters
Dehydrators
Self Cleaning Water Strainers
Duplex Strainers
Grease Extractors

Andale Company

ANDALE

Sixteenth and Arch Streets
PHILADELPHIA



CROWN
THE BETTER GAS RANGE
Manufactured by
CROWN STOVE WORKS
CHICAGO, ILL.
ON DISPLAY
BOOTH 253
A. G. A. CONVENTION

"SAME OLD CROWD!"

Said the man, as he glanced over one of these ads and noticed the familiar list of Ridgway Elevator users we often print.

Here is the reason:—The names are from our order book and

"THE SAME OLD CROWD" GET MORE AND MORE RIDGWAY ELEVATORS ALL THE TIME.

So will you repeat orders if once you get to know this wonderful machine and its many excellences.

RIDGWAY ELEVATORS ALWAYS GO.
NEVER ANY REPAIRS.
COST NOTHING TO RUN.

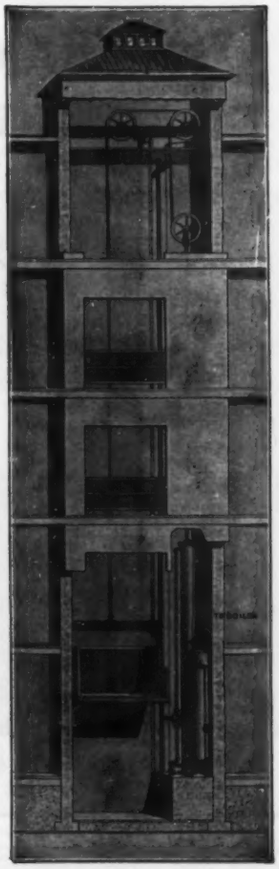
The simplicity of the Ridgway Elevator should lead you to

"HOOK 'ER TO THE BILER"

United Gas Imp. Co.	H. J. Heinz Co. "57"	United States Government
Yale & Towne Mfg. Co.	International Har. Co.	E. I. Du Pont & Co.
Cluett, Peabody & Co.	John Wanamaker	General Electric Co.
Consolidated Gas Co.	Remington Typewriter Co.	Packard Motor Car Co.
B. F. Goodrich Co.	Continental Gin Co.	Continental Can Co.
Hammermill Paper Co.	Erie Railroad Co.	American Tobacco Co.
Procter & Gamble Co.	Ohio Box Board Co.	John Morrell & Co.

Direct Acting

Double Geared



Craig Ridgway & Son Co.

Over 3,000 in daily use. COATESVILLE, PA.

BAROMETERS

PHILADELPHIA, THE WORKSHOP OF THE WORLD, has 14,000 Manufacturing Establishments of which many have World-Wide Reputations.

"PRINCO" STANDARD FORTIN MERCURIAL BAROMETERS

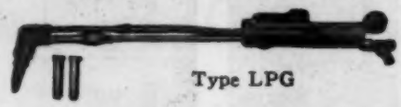
are in World-Wide use because they, too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY
1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.

Lower Cutting Costs
With this Torch



Type LPG

Uses City Gas, Natural Gas or By-Product Gas

A torch especially developed for use with City Gas, Natural Gas or By-Product Gas. Employs famous Milburn principle of super-mixing which results in greater efficiency and economy. Get full details of this LPG Cutting Torch and complete Milburn line of cutting and welding apparatus.

Ask for Booklet 371-10 on Welding and Cutting Apparatus. Advise also if interested in Oil Pre-heaters, Paint Spray Equipment, Carbide Lights, Etc.

The Alexander Milburn Company

1416-1428 W. Baltimore St. Baltimore, Md.

CLARK INDUSTRIAL BURNER TIPS

Industries, in which gas is the fuel, employ these tips in various gas capacities, and forms adapted to specific needs.

Low pressure fan blast systems adopt this type because of the dependability and endurance of lava.

Made in 15, 30, and 45 cubic foot capacities to fit standard reducing couplings.

We invite correspondence.

American Lava Corporation

29-59 William St. Chattanooga, Tenn.

Manufacturers of Lava Tips & Heat Resistant Insulators

FLANGE END

VALVES

We can furnish Valves for working pressures up to 1200 lbs. per sq. in.

Send for Circular 5

The LUDLOW

VALVE MANUFACTURING COMPANY
TROY, N. Y.

New York 81 Fulton St. | Boston Tremont Bldg. | Philadelphia Harrison Building
Chicago The Rookery | Pittsburgh Oliver Bldg. | Kansas City R. A. Long Bldg.

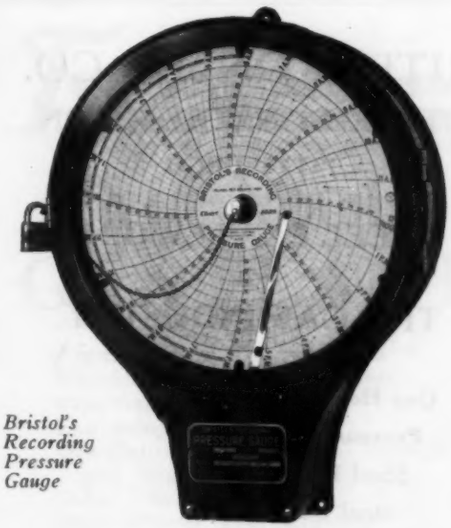
LEADING GAS COMPANIES USE LAMBERT METERS

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.



Bristol's Recording Pressure Gauge

The Continuous Record Leaves No Operating Time Unaccounted For

AT a glance you can tell whether the steam pressure supply in the producer is being kept steady and uniform—the exact time and extent of any fluctuation being instantly revealed in the record line.

Thus it becomes an easy matter for even inexperienced operatives to regulate the steam pressure accurately and according to schedule; eliminating all possibility of damage to the grates from overheating.

Bristol's Equipment can be furnished to take care of almost any Recording Instrument requirement in the gas industry. Designed with a view to simplicity of operation; having dust-moisture- and fume-proof construction, they will "stand up", and operate accurately for years with a minimum of care and adjustment.

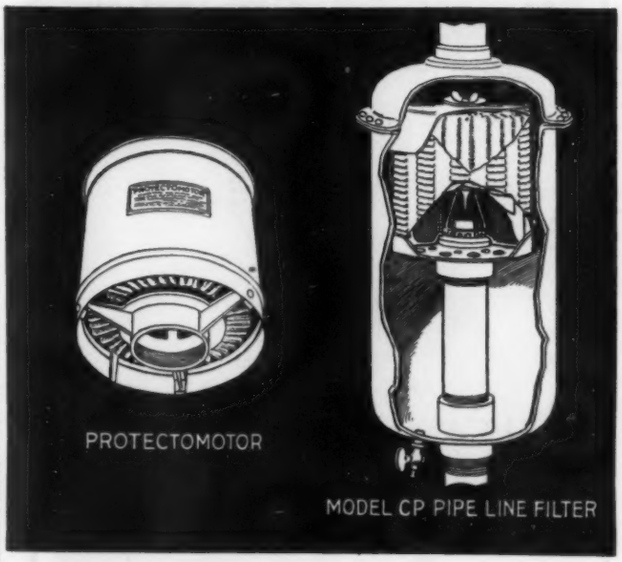
Bristol's Engineering Service is at your disposal without obligation.

The Bristol Company

Waterbury, Conn.

SEE BRISTOL EXHIBIT AT BOOTH 36 A. G. A. CONVENTION

Supplies 99 9/10 % CLEAN AIR!



Unfiltered air is a floating mass of millions of abrasive particles that grind and score and wear down the glass-smooth inner surfaces of air compressors, blowers, engines and tools. The result is big losses in efficiency, high maintenance costs and proportionately short life for such equipment.

Tens of thousands of America's large industrial firms have ended this costly "dust tax" by installing the Protectomotor—the filter which is guaranteed to deliver air 99 9/10% CLEAN.

The Protectomotor Air Filter reduces carbon deposits 60 to 70%—it reduces wear on moving parts as much as 75 to 85%—and it enables pneumatic equipment to operate three to five times longer than usual before requiring overhauling.

The Protectomotor is also made for pipe line filtration. Delivers dry, clean air for paint spraying, cleaning machinery, pneumatic tools, and all other processes which employ air power lines from a central pressure tank.

Write today for booklet and information on our 10-day FREE TRIAL OFFER.

Clean, white filtering element before being placed in service on machine.

After few weeks' service, showing dust, sand, grit and dirt kept out of motor.

Staynew Filter Corporation

115 N. Water Street, Rochester, N. Y.

PROTECTOMOTOR

REG. U.S. PAT. OFF.

99 9/10 Per Cent EFFICIENT

AIR FILTERS

Byllesby Engineering and Management Corporation

BYLLESBY PIONEERS IN PUBLIC SERVICE ENGINEERING FINANCE MANAGEMENT

CHICAGO NEW YORK

Pittsburgh San Francisco

RITER-CONLEY CO.

STEEL CONSTRUCTION

PITTSBURGH

STEEL PLATEWORK

FOR

THE GAS INDUSTRY

Gas Holders
Pressure Tanks
Steel Pipe
Steel Barges
Oil Tanks
Purifiers

BRANCH OFFICES

New York — Boston — Baltimore
Chicago — Philadelphia — Detroit
Cleveland — Cincinnati — Seattle
San Francisco — Los Angeles

WESTMORELAND "CRITERION" GAS COAL

The Standard for Gas Making Since 1854

Since this Company commenced operations, its well-known Westmoreland "Criterion" Gas Coal has been largely used by the Gas Companies of Northeastern United States and Canada, and its character is established as having no superior in gas giving qualities and freedom from sulphur and other impurities.

Mines situated on the Pennsylvania Railroad.
in Westmoreland County, Pa.

THE WESTMORELAND COAL COMPANY

Principal Office, Lewis Building, 15th and Locust Sts., Philadelphia, Pa.

Shipping Ports: Philadelphia, Baltimore, South Amboy, N. J., Lake Ports.

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P Co

Manufacturers of All Kinds of Gas Apparatus

NEWARK · NEW JERSEY

Tycos Temperature Instruments

INDICATING - RECORDING - CONTROLLING

FOR YOUR GAS PLANT

Ammonia Still Thermometers
Engraved Stem Thermometers
Flue-Gas Thermometers
Gas Ranges
Gas-Main Thermometers, Straight and Angle Stem
Index Thermometers
Meter-Prover Thermometers
Precision, Engraved Thermometers
Pyrometers
Recording Thermometers
Still-Thermometers
Superheated Steam Thermometers
Temperature and Pressure Regulators
Water Circulation Thermometers
Anemometers
Aneroid Barometers
Base Metal, Rare Metal and Radiation Pyrometers
Electric Contact Thermometers
Fery Radiation Pyrometers
Hand Levels
Hydrometers
Hygrometers
Inclinometers
Mercurial Barometers
Mercurial, Recording and Index Thermometers for all Industrial and Laboratory Applications
Mercury Column Vacuum Pressure and Gauges
Mineral Oil Testing Instruments
Rain Gauges
Recording Barometers
Temperature, Pressure and Time Regulators
Thermographs
Thermometers of all kinds
Surveying Compasses

WRITE FOR

GAS PLANT CATALOG

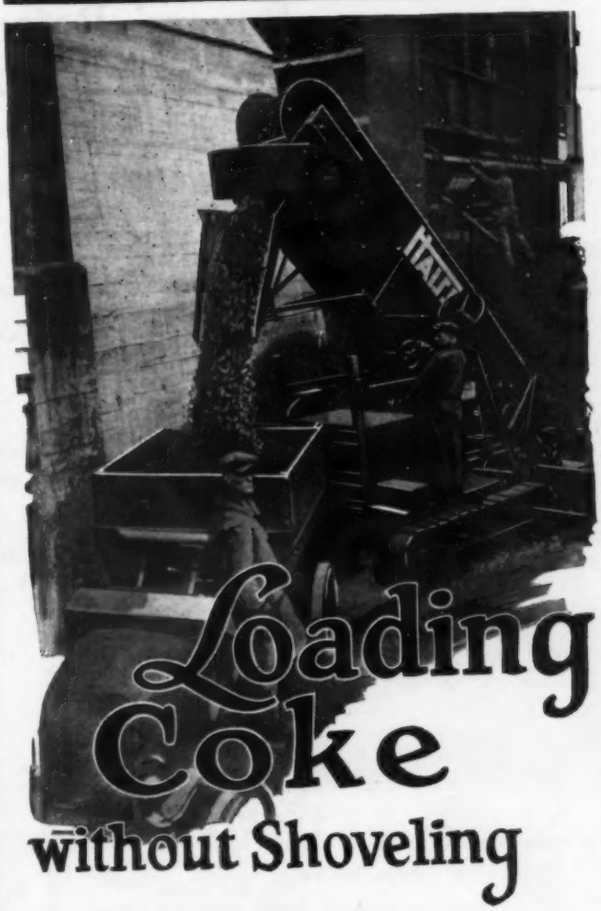
Taylor Instrument Companies

Rochester, N. Y., U. S. A.

Canadian Plant
Tycos Building
Toronto

Manufacturing Distributors
in Great Britain
Short & Mason, Ltd., London

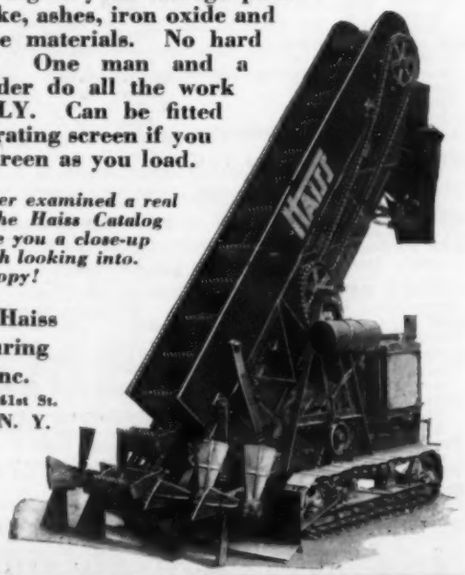
There's a Tycos or a Taylor Temperature Instrument for Every Purpose



Loading Coke without Shoveling

If the experience of one big Eastern gas company is any guide the use of a HAISS LOADER is a direct road to cost saving at your storage piles of coal, coke, ashes, iron oxide and other loose materials. No hard shoveling! One man and a Haiss Loader do all the work —CHEAPLY. Can be fitted with a vibrating screen if you want to screen as you load.

Have you ever examined a real Loader? The Haiss Catalog 527 will give you a close-up picture worth looking into. Ask for a copy!



George Haiss Manufacturing Co., Inc.
Park Ave. & 141st St.
New York, N. Y.

Representatives in Principal Cities

Buyers' Reference Index

See page 157 for advertisements of these products

A. B. C. SELF CLINKERING GRATES
The Western Gas Construction Company.

ACCUMULATORS—STEAM
The Gas Machinery Co.
Ruth's Steam Accumulator Co.
A. O. Smith Corp.
Smoot Engineering Corp.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

ACETYLENE EQUIPMENT
American Lava Corp.
Alexander Milburn Co.

ACCOUNTING MACHINES
Remington Rand, Inc.

AIR FILTERS
Staynew Filter Corp.

AMMONIA CONCENTRATORS
Bartlett Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA CONCENTRATED LIQUOR PLANTS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

AMMONIA PIPE
National Tube Company.

AMMONIA RECOVERY APPARATUS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

AMMONIA STILLS
Bartlett-Hayward Co.
Cruse-Kemper Co
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA TEST
American Meter Co.

APPRAISALS & INVENTORIES
Stacey Bros. Gas Construction Co.
United Engineers & Constructors, Inc.

APPARATUS
Laboratory Experimental
American Meter Co.
Service
American Meter Co.

ASH STORAGE BINS
C. W. Hunt Co., Inc.
Semet-Solvay Engineering Corp.
Riter-Conley Co.
The Stacey Mfg. Co.

AUDITS
United Engineers & Constructors, Inc.

AUTOMATIC CONTROLS FOR WATER GAS APP.
United Engineers & Constructors, Inc.

AUTOMATIC RAILWAYS
C. W. Hunt Co., Inc.

BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co.

BACKRUN GAS EQUIPMENT
Semet-Solvay Engineering Corp.

BAGS
Safety Gas Main Stopper Co.

BAROMETERS
Connelly Iron Sponge & Governor Co.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

BENCHES
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Gas Machinery Co.
The Jersey City Refractories Co., Inc.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BENZOL
Bartlett-Hayward Co.
Carl Still, Inc.
The Koppers Construction Co.

BENZOL RECOVERY PLANTS
Semet-Solvay Engineering Corp.

BLOWERS
Industrial Burner
Connersville Blower Co.
Revivifying
Connersville Blower Co.
Water Gas Set
Connersville Blower Co.

BLOWERS & BOOSTERS
Gas Engineering Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BLUE GAS PLANT
Bartlett-Hayward Co.
Carl Still, Inc.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BOILERS—WASTE HEAT
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

BOOKKEEPING MACHINES
Remington Rand, Inc.

BOOSTERS
Connelly Iron Sponge & Governor Co.
Connersville Blower Co.

BRICK
Fire and Checker
Botfield Refractories Co.
The Gas Machinery Co.
Improved Equipment Co.-Russell Eng. Corp.
The Jersey City Refractories Co., Inc.
United Engineers & Constructors, Inc.
Silica
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Company.

BRUSHES, PIPE CLEANING
Safety Gas Main Stopper Co.

B. T. U. INDICATORS
Alpha-Lux Co.

BUCKETS—CLAMSHELL
Geo. Haiss Mfg. Co.

BUILDINGS
United Engineers & Constructors, Inc.

BURNERS (Industrial)
American Lava Corp.
The C. M. Kemp Mfg. Co.
Conversion
Cleveland Gas Burner & Appliance Co.
Conversion House Heating
Roberts Gas Burner Corp.
Fuel
Cleveland Gas Burner & Appliance Co.

BY-PRODUCT COKE
Semet-Solvay Co.

BY-PRODUCT PLANTS
Bartlett-Hayward Co.
Carl Still, Inc.
The Gas Machinery Co.
International Coal Carbonization Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
West Gas Improvement Co.

CABLE RAILWAYS
C. W. Hunt Co., Inc.
Alpha-Lux Company.
American Meter Co.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
John J. Griffin & Company.

CALORIMETER ACCESSORIES
American Meter Co.

CARBONIZATION
The Gas Machinery Co.
Low Temperature
International Coal Carbonization Co.

CARBURETTED WATER GAS
The Western Gas Construction Co.

CARBURETTED WATER GAS PLANTS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

CARS
C. W. Hunt Co., Inc.

CAST IRON PIPE
Bell
Cast Iron Pipe Research Ass'n.
Spigot
Cast Iron Pipe Research Ass'n.

CEMENTS
The Jersey City Refractories Co., Inc.
Quigley Furnace Spec. Co., Inc.
Acid-proof
Botfield Refractories Company.
Joseph Dixon Crucible Company.
Quigley Furnace Spec. Co., Inc.
Firebrick
Botfield Refractories Company.
Improved Equipment-Russell Engineering Corp.
High Temperature
Alpha-Lux Company.
Botfield Refractories Company.
Joseph Dixon Crucible Company.
E. J. Lavino & Co.
Quigley Furnace Spec. Co., Inc.
Refractory
Botfield Refractories Company.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Co.

CHAMBER OVENS
United Engineers & Constructors, Inc.

CHARGING MACHINERY
Bartlett-Hayward Co.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

CHUTES
C. W. Hunt Co., Inc.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

CLAMPS (PIPE)
S. R. Dresser Mfg. Co.

CLOCKS & WATCHES, Stop
American Meter Co.

COALS
Pittsburgh Coal Co.
Westmoreland Coal Co.

COAL GAS APPARATUS
Bartlett-Hayward Co.
Carl Still, Inc.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Company.
The Western Gas Construction Company.

COAL & COKE BINS CASTINGS
The Koppers Construction Co.
The Stacey Mfg. Co.

COAL AND COKE HANDLING MACHINERY
Bartlett-Hayward Co.
Dry Quenching Equipment Corp.
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.

COAL TAR PRODUCTS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COAL TUBES
C. W. Hunt Co., Inc.

COCKS
Angle Stove
Kitson Co.
Boiler Drain
Kitson Co.
Hose
Kitson Co.
Meter
American Meter Co.
Kitson Co.
Superior Meter Co.
Service
American Meter Co.
Kitson Co.

COKE CRUSHERS
The Koppers Construction Co.

COKE QUENCHING
Dry Quenching Equipment Corp.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COKE RECLAMATION SYSTEMS
C. W. Hunt Co., Inc.

COMPUTERS
Heating Value
United Engineers & Constructors, Inc.

CONDENSERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
High Duty
Stacey Bros. Gas Const. Co.
United Engineers & Constructors, Inc.

CONTRACTORS' TUBS
C. W. Hunt Co., Inc.

CONTROLS
The Bristol Company.
Robertshaw Thermostat Co.
Combustion
Smoot Engineering Corp.
Gas Pressure
Smoot Engineering Corp.
Gas Producer
Smoot Engineering Corp.
Hot Water Heat System
The Cleveland Heater Company.
Water Gas Machine
Smoot Engineering Corp.

CONVEYORS
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.

CONCENTRATORS, AMMONIA
(See Ammonia Concentrators.)
Bartlett-Hayward Co.
Isbell-Porter Company.
The Stacey Mfg. Co.

COOLERS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
Air
Andale Company.
Ammonia Liquor
Andale Company.
Gas
Andale Company.
Oil
Andale Company.

COOLING COILS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

COUPLINGS
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
National Tube Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.

COUPLINGS—FLEXIBLE
The P. H. & F. M. Roots Company.

Never An Accident Where This Regulator Has Been Installed - -

It is absolutely essential that safety precautions be taken where houses or small consumers of gas are supplied from lines under high pressure.

The Fulton House Regulator

was designed for this purpose. It is provided with an Automatic Cut-off. Should any accident happen to the line or the regulator, no danger can result to the consumer. The Automatic Cut-off provides automatic safety—*real safety!* For this reason, there has never been an accident where a Fulton Regulator has been installed.

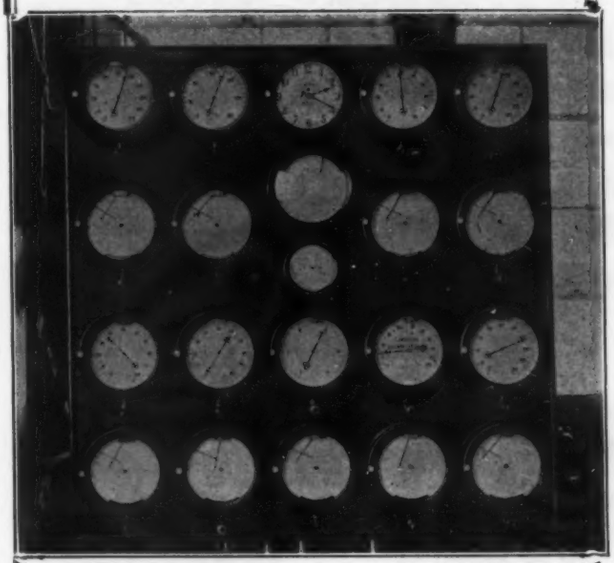
Write for our catalogue. Also ask for our booklet containing directions for setting and operating all types of gas regulators. Gas men will find both of value.

The Chaplin-Fulton Mfg. Co

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in All Sizes. From 1 inch to 24 inches: For All Service. 1 Oz. Up to 1,600 Lbs. Pressure to Square Inch.

28-40 Penn Avenue **Pittsburgh, Pa.**

GAUGE BOARDS



American Gas Maker's Gauges, Recording Gauges, Clock and Recording Thermometers in a large New York Gas Plant. Centralized control over critical pressures and temperatures makes for plant efficiency.

Send for our Gas Makers text book "Manufactured Gas" if you haven't received your copy.

Write for the following Catalogs:

Gas Maker's Gauge Catalog P-7
Recording Gauge Catalog E-7
Thermometer Catalog F-7
Recording Thermometer Catalog H-7
Tachometer Catalog J-7
Temperature Controller Catalog R-7

AMERICAN INSTRUMENTS
SINCE 1851

CONSOLIDATED ASHCROFT HANCOCK CO. INC.
AMERICAN SCHAEFFER & BUDENBERG DIVISION
338 Berry Street Brooklyn, N.Y.

Buyers' Reference Index

See page 157 for advertisements of these products

CRUCIBLES
Joseph Dixon Crucible Company.
CRUSHERS
Riter-Conley Company.
CUBIC FOOT BOTTLES
American Meter Co.
Lambert Meter Co.
DE-EMULSIFIERS
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
DEHYDRATORS, GAS
Andale Company.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.
DEMONSTRATION METERS
Lambert Meter Co.
DIAPHRAGMS
Lambert Meter Co.
(Meter)
American Meter Co.
DISCHARGING MACHINERY
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.
DRAFT GAUGES
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.
ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.
ELEVATORS
C. W. Hunt Co., Inc.
Craig Ridgway & Son Co.
ENGINE INDICATORS
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
ENGINEERS
American Meter Co.
The Gas Machinery Co.
Combustion
Bartlett-Hayward Co.
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
United Engineers & Constructors, Inc.
Consulting
Bartlett-Hayward Co.
United Engineers & Constructors, Inc.
George H. Waring.
The Western Gas Construction Company.
Contracting
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Company.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
Riter-Conley Company.
Stacey Gros. Gas Const. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.
Distribution
United Engineers & Constructors, Inc.
Measurement
American Meter Co.
EXHAUSTERS
Connersville Blower Co.
The Gas Machinery Co.
Isbell-Porter Company.
The P. H. & F. M. Roots Company.
The Western Gas Construction Company.
EXPANSION BENDS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
FILES (Steel and Wood)
Remington Rand, Inc.
FILES (Visible)
Remington Rand, Inc.
FILTERS, Gas
American Meter Co.
FIREBRICK, CEMENT
Quigley Furnace Specialties Co., Inc.
FIREBRICK CHECKER BRICK
(See Brick)
Botfield Refractories Company.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
The Jersey City Refractories Co., Inc.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
FIRST AID EQUIPMENT
United Engineers & Constructors, Inc.
FITTINGS
James B. Clow & Sons.
Isbell-Porter Company.
Kitson Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe and Foundry Co.
The Western Gas Construction Company.
Plain End and Flanged
Cast Iron Pipe Research Association.
FIXTURES
American Lava Corp.
General Gas Light Co.
FLOORS, IRON, BRICK, AND STEEL
The Gas Machinery Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
FLOW METERS
Lambert Meter Co.
FLUE PIPE (Cast Iron Oval)
James B. Clow & Sons.
Semet-Solvay Engineering Corp.
FLUES (Consuming) for Gas Range
Akme Flue, Inc.
FURNACES
James B. Clow & Sons.
Gas Fired
The C. M. Kemp Mfg. Co.
Gas Soldering
American Meter Co.
GAS ANALYSIS APPARATUS
Metric Metal Works.
GASKETS
American Meter Co.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Pittsburgh Equitable Meter Co.
GAS COAL
Pittsburgh Coal Co.
Westmoreland Coal Co.
GASOMETERS (Test)
American Meter Co.
GAS PLANTS, COMPLETE
Carl Still, Inc.
Gas Engineering Co.
Isbell-Porter Company.
West Gas Improvement Co.
GASSING MACHINE
American Meter Co.
Lambert Meter Co.
GAS TAPE
Connelly Iron Sponge & Governor Co.
GAS TESTING APPARATUS
Metric Metal Works.
GATES—WIND & BLAST
The P. H. & F. M. Roots Company.
GAUGE BOARDS
The Bristol Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
GAUGES
American Meter Co.
The Bristol Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Maryland Meter Co.
Metric Metal Works.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Taylor Instrument Companies.
The Western Gas Construction Company.
Mercury
Precision Thermometer & Instrument Company.
Pressure-Recording
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
D. McDonald & Co.
Precision Thermometer & Instrument Company.
Siphon
Precision Thermometer & Instrument Company.
Tank
Precision Thermometer & Instrument Company.
Water
Precision Thermometer & Instrument Company.
GENERATORS, Oxygen & Acetylene
Alexander Milburn Co.
GLOVES
Rubber
Safety Gas Main Stopper Co.
GOVERNORS
Pittsburgh Equitable Meter Co.
Automatic
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
GOVERNORS (Calorimeter and Double Dry)
American Meter Co.
Coke Oven
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
District
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Helme & McIlhenny.
Isbell-Porter Co.
Smoot Engineering Corp.
Exhauster
Connelly Iron Sponge & Governor Co.
Connersville Blower Co.
The Gas Machinery Co.
Isbell-Porter Co.
The P. H. & F. M. Roots Company.
Smoot Engineering Corp.
High Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Laboratory
American Meter Co.
Connelly Iron Sponge & Governor Co.
Lambert Meter Co.
D. McDonald & Co.
Reynolds Gas Regulator Co.
Low Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Lambert Meter Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Isbell-Porter Company.
Station
Helme & McIlhenny.
GRAPHITE GRIP GREASES
Joseph Dixon Crucible Company.
GRAPHITE WATER PROOF GREASES
Joseph Dixon Crucible Company.
GRATES for Water Gas Generators
Semet-Solvay Engineering Corp.
GRAVITOMETERS
Precision Thermometer & Instrument Company.
GRIDS, for Scrubbers
Semet-Solvay Engineering Corp.
HEATERS
James B. Clow & Sons.
Feed Water
Andale Company.
House
American Gas Products Corp.
Cleveland Gas Burner & Appliance Co.
The Cleveland Heater Company.
Roberts Gas Burner Corp.
Room
American Gas Products Corp.
American Stove Company.
General Gas Light Co.
Homestead Heater Company.
Welsbach Company.
Water
The Cleveland Heater Company.
Humphrey Company.
Welsbach Company.
Hot Water
Electric Porcelain & Mfg. Co.
Kompak Company.
HIGH CAPACITY METERS
Lambert Meter Co.
HIGH HEAT RESISTING GRAPHITE GREASES
Joseph Dixon Crucible Company.
HIGH PRESSURE PIPE LINES
The Western Gas Construction Company.
HOISTS
The Gas Machinery Co.
Geo. Haiss Mfg. Co., Inc.
C. W. Hunt Co., Inc.
HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
Riter-Conley Company.
The Stacey Mfg. Co.
HOTELS
Shelburne Hotel.
United Engineers & Constructors, Inc.
HOWARD AUTOMATIC CHARGERS
The Western Gas Construction Company.
HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Gas Engineering Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
HYDROGEN SULPHITE TEST (Apparatus)
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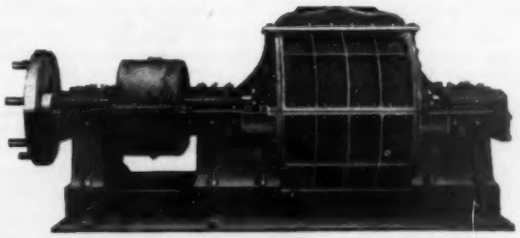
HYDROMETERS
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.
INCINERATORS, GAS-FIRED
Kernit Incinerator Co.
INDUSTRIAL GAS MIXERS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Smoot Engineering Corp.
INDUSTRIAL TRACK
C. W. Hunt Co., Inc.
IRON BORING OXIDE
Gas Purifying Materials Co., Inc.
IRON SPONGE
Connelly Iron Sponge & Governor Co.
INSTRUMENTS
Alpha-Lux Company.
The Bristol Company.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Lambert Meter Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.
Recording
American Meter Co.
JOINTS (Pipe)
S. R. Dresser Mfg. Co.
U. S. Cast Iron Pipe & Foundry Co.
Insulating
United Engineers & Constructors, Inc.
JOINT RUNNERS
Safety Gas Main Stopper Co.
LAMPS
General Gas Light Co.

"The Old Reliable"

Wilbraham - Green

Gas Exhausters and Pushers



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Built for Engine Drive or Motor Drive

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For special conditions our long Engineering Experience is at your service. —Write Us Your Needs.

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YOUR consumers rightfully expect you and your organization to be able to inform them of the developments in the fuel and furnace field that would be to their advantage to adopt.

To maintain their confidence and good will you must be completely informed.

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If not, you owe it to your consumers and your company to investigate.

Write, phone or telegraph.

The C.M. KEMP Mfg. Co.

Baltimore, Md.

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See page 157 for advertisements of these products

LAMP POSTS
General Gas Light Co.
LAVA BURNER GRIDS
American Lava Corp.
LAVA PILOT TIPS
American Lava Corp.
LOADERS—BUCKET, PORTABLE
Geo. Haiss Mfg. Co.
LOCKERS
Remington Rand Co.
LOOSE LEAF EQUIPMENT
Remington Rand Co.
LUX MATERIAL
Alpha-Lux Company.
LUX SPONGE
Alpha-Lux Company.
MANILA AND WIRE ROPE
C. W. Hunt Co., Inc.
MANOMETERS
Precision Thermometer & Instrument Company.
MANTLES
General Gas Light Co.
Welsbach Company.
MASKS—GAS
Safety Gas Main Stopper Co.
MAST & GAFF OUTFITS
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.
MEASURING CHUTES
C. W. Hunt Co., Inc.
MECHANICAL GENERATORS for Water Gas App.
United Engineers & Constructors, Inc.
METER CONNECTIONS
American Meter Co.
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
Lambert Meter Co.
D. McDonald & Co.
Maryland Meter Works.
Pittsburgh Equitable Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
METER DIAPHRAGM GRAPHITE
Joseph Dixon Crucible Company.
METER REPAIRING
Lambert Meter Co.
METER TESTER, Hydro-Pneumatic
American Meter Co.
METERS
Pittsburgh Equitable Meter Co.
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D. McDonald & Co.
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Neptune Meter Co.
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The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
United Engineers & Constructors, Inc.
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Helme & McIlhenny.
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Nathaniel Tufts Meter Works.
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D. McDonald & Co.
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The Sprague Meter Co.
Superior Meter Co.
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Connersville Blower Co.
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Orifice
American Meter Co.
Positive
The Sprague Meter Co.
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American Meter Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
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Connersville Blower Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
Nathaniel Tufts Meter Works.
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American Meter Co.
The Gas Machinery Co.
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American Meter Co.
John J. Griffin & Company.
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D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
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American Meter Co.
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Connelly Iron Sponge & Governor Co.
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The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Semet-Solvay Engineering Corp.
Smoot Engineering Corp.
MOISTURE DETERMINATORS
United Engineers & Constructors, Inc.
MOTOR CARS
C. W. Hunt Co ,Inc.
NAPHTHALENE EXTRACTORS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
OFFICE FURNITURE
Remington Rand, Inc.
ORE, CHROME
E. J. Lavino & Co.
OVEN SHELF; SAFETY
Wm. Parke, Inc.
OVENS—COKE AND GAS
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Semet-Solvay Engineering Corp.
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Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co., Inc.
E. J. Lavino & Co.
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PACKING
Asbestos
Safety Gas Main Stopper Co.
PAINTS
Joseph Dixon Crucible Company.
Safety Gas Main Stopper Co.
The Stacey Mfg. Co.
Wailes Dove-Hermiston Corp.
Metal Protective
Semet-Solvay Co.
PAINTS, ANTI ACID AND ALKALI
Quigley Furnace Spec. Co., Inc.
PAINTS, RUSTPROOF
Quigley Furnace Spec. Co., Inc.
PHOTOMETERS
Connelly Iron Sponge & Governor Co.
PIPE
National Tube Co.
The Stacey Mfg. Co.
Bell
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Semet-Solvay Engineering Corp.
McWane Cast Iron Pipe Co.
Bell and Spigot
American Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
Cast Iron
American Cast Iron Pipe Co.
James B. Clow & Sons.
McWane Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
Centrifugal
American Cast Iron Pipe Co.
Flange
American Cast Iron Pipe Co.
James B. Clow & Sons.
Semet-Solvay Engineering Corp.
U. S. Cast Iron Pipe & Foundry Co.
Screw Joint Cast Iron Pipe
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McWane Cast Iron Pipe Co.
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James B. Clow & Sons.
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Welded Steel
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Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
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Improved Equipment-Russell Engineering Corp.
The Koppers Construction Co.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.
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Cruse-Kemper Co.
C. W. Hunt Co., Inc.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Floor
Gas Engineering Co.
The Gas Machinery Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.
PLUGS, SERVICE AND MAIN
Rubber
Safety Gas Main Stopper Co.
Soft Wood
Safety Gas Main Stopper Co.
PORTABLE TEST METERS
Lambert Meter Co.
PRODUCER GAS PLANT
Gas Engineering Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
PRODUCER GAS STEAM
American Meter Co.
PROVERS—Critical Flow for H. P. Field Testing
American Meter Co.
PROVERS—METER
John J. Griffin & Company.
Helme & McIlhenny.
Lambert Meter Co.
D. McDonald & Co.
Pittsburgh Equitable Meter Co.
Superior Meter Co.
PUMPS
Drip
American Meter Co.
The Gas Machinery Co.
Lambert Meter Co.
D. McDonald & Co.
Gas
The P. H. & F. M. Roots Company.
Gas Bag
Safety Gas Main Stopper Co.
Hand
Lambert Meter Co.
Oil
Connersville Blower Co.
The Gas Machinery Co.
D. McDonald & Co.
The P. H. & F. M. Roots Company.
Power
Connersville Blower Co.
The P. H. & F. M. Roots Company.
Pressure
Connersville Blower Co.
The P. H. & F. M. Roots Company.
Service
American Meter Co.
Lambert Meter Co.
Superior Meter Co.
Service Cleaner
American Meter Co.
John J. Griffin & Company.
Lambert Meter Co.
Safety Gas Main Stopper Co.
Superior Meter Co.
Tar
Connersville Blower Co.
The P. H. & F. M. Roots Company.
Water
Connersville Blower Co.
The P. H. & F. M. Roots Company.
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Connersville Blower Co.
The P. H. & F. M. Roots Company.
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The P. H. & F. M. Roots Company.
PURIFIERS
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Cruse-Kemper Co.
Gas Engineering Co.
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Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
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The Stacey Mfg. Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
PURIFYING MATERIALS
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Gas Purifying Materials Co., Inc
The Koppers Construction Co.
E. J. Lavino & Co.

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District Manager for Gas Utility

In District having manufacturing plant, transmission mains, and 3500 meters. In Middle West. Must be a man capable of managing office and local affairs, with a knowledge of production and distribution.

Address Box 951, care of American Gas Journal, 53 Park Place, New York City, enclosing photograph and stating fully age, qualifications, previous employment, references and salary requirements.

FOR SALE

One station meter in cast iron case, 10 ft. 9⅞ in. by 10 ft. 5½ in. inside diameter. Front and back heads 11 ft. 2 in. diameter by 1¼ in. thick. Back head carries two outlet connections for 16 in. pipe and one inlet for 20 in. pipe. The case contains one Hinman drum 9 ft. in diameter, built in 1926. The dial train and all gauges were renewed in 1926, when the new drum was built. The meter has a capacity of 70,000 cu. ft. per hour at 1" differential pressure. Address New Haven Gas Light Co., New Haven, Conn.

POSITION WANTED

University Graduate with eighteen years' experience in the gas industry and some electric experience, seeks position as manager of property with at least 5,000 meters. Address Box 948, care American Gas Journal, 53 Park Place, New York City.

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Fire Brick Cement
ADACHROME
ADACHROME
Fines
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IF you will send us an outline of your refractories difficulties, we shall be glad to submit suggestions.

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Register your name with the American Gas Journal if you contemplate making a change in your present position.

We frequently hear of vacancies in the industry which might interest you.

This service is both free and confidential.

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Manufacturers of GOVERNORS, APPARATUS and EQUIPMENT
IRON Cowelly Iron Sponge and Governor Co. SPONGE
New York, Chicago U.S.A.
USE THE BENEFIT OF 50 YEARS EXPERIENCE!

Buyers' Reference Index

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PURIFIER TRAYS
Bartlett-Hayward Co.
Connelly Iron Sponge & Governor Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

PYROMETERS
The Bristol Company.
The Western Gas Construction Company.
Indicating
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.
Radiation
Taylor Instrument Companies.
Recording
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.

RADIATORS
Gas Steam
American Gas Products Corp.
James B. Clow & Sons.
Gas Water
James B. Clow & Sons.

RANGES—GAS
American Stove Co.

RECORDING DEMAND METERS
Lambert Meter Co.

REFRACTORY CEMENTS
Botfield Refractories Company
Joseph Dixon Crucible Company
The Gas Machinery Co.
Improved Equipment—Russell Engineering Corp.
E. J. Lavino & Co.
Quigley Furnace Spec. Co. Inc.

REFRACTORY GUN
Botfield Refractories Company
Quigley Furnace Spec. Co. Inc.

REFRACTORY LININGS
Alpha-Lux Company
Botfield Refractories Company
Joseph Dixon Crucible Company.
The Gas Machinery Co.
Improved Equipment—Russell Engineering Corp.
Quigley Furnace Spec. Co. Inc.
United Engineers & Constructors Inc.
The Western Gas Construction Company

REGULATORS
American Meter Co.
The Chaplin Fulton Mfg. Co.
Connersville Blower Co.
Connelly Iron Sponge & Governor Co.
Grobie Gas Regulator Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Robertshaw Thermostat Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Taylor Instrument Companies
Air Pressure
Smoot Engineering Corp.
Coke Oven Suction Main
Smoot Engineering Corp.
Exhauster
Smoot Engineering Corp.
Furnace Pressure
Smoot Engineering Corp.
Oven
American Stove Co.
Oxygen & Acetylene
Alexander Milburn Co.
Steam Pressure
Smoot Engineering Corp.

REPAIR PARTS
Lambert Meter Co.

RESPERATING OUTFITS
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RETORTS
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Improved Equipment—Russell Engineering Corp.
Vertical
United Engineers & Constructors Inc.
West Gas Improvement Co.
Silica and Clay
Improved Equipment—Russell Engineering Corp.
The Gas Machinery Company

RETORT CEMENT
Alpha-Lux Company
Botfield Refractories Company
Joseph Dixon Crucible Company
The Gas Machinery Co.
Improved Equipment—Russell Engineer Corp.
Quigley Furnace Spec. Co. Inc.

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Reynolds Gas Regulator Co.

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SAFES
Remington Rand Inc.

SAFETY VALVES
Connelly Iron Sponge & Governor Co.

SCREENS, ELECTRIC VIBRATING
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D. McDonald & Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Superior Meter Co.
Taylor Instrument Companies.

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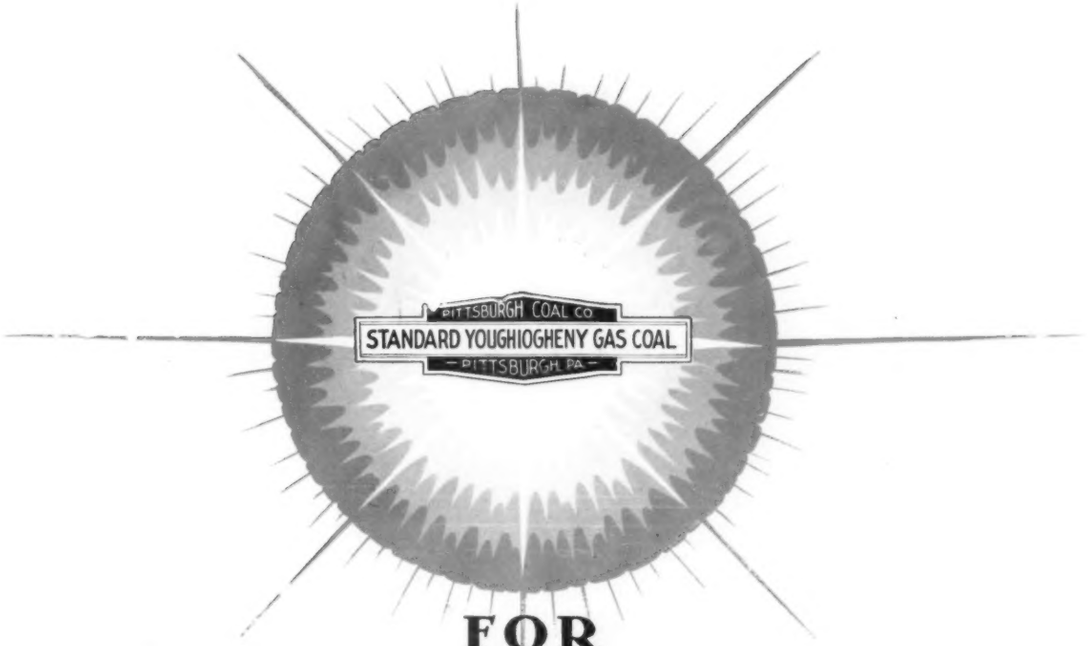

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